MAY, 1943

Industrial FINISHING

Published Monthly in the Interest of Modern Production Finishing

VICTORY BUY WAR SAVINGS BONDS AND STAMPS

TECHNOLOGY DEPT.

CONVOY means Protection...

CONVOYS have a big responsibility in protecting vital cargoes until they are delivered. Organic Finishes also have a big responsibility. Many of these vital cargoes are composed of bombs, shells, tanks, and other war equipment, all of which must be protected from rust, corrosion, etc. — protected while in storage . . while crossing the oceans . . and from then on until used. You can depend on Lilly's Finishes to provide this 3-way protection for your war products.

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Indianapolis, Indiana
Branches : Chicago, Ill.; Grand Rapids, Mich.; Gardner, Mass.
THE LILLY COMPANY, High Point, North Carolina

Top half of cadmium plated panel prime-coated with Paladin. Lower half of panel coated with conventional primer. The entire panel coated with a wrinkle finish. Both primers and top coat baked on together. Note firm adhesion of Paladin primer on this hard-to-finish surface as compared to the poor adhesion offered by conventional primer.

IF NOTHING ELSE STICKS TRY *Paladin**

*COATINGS OF PLASTIC BY ROXALIN

BASED on an entirely new principle in the manufacture of organic finishes, Paladin utilizes some of the newer plastics for the first time in surface coatings.

This new finish is engineered specifically for use on hard-to-finish metals such as cadmium, zinc, magnesium, aluminum, anodized aluminum, stainless steel, brass, copper, etc.

Because of its unique adhesion, coupled with toughness and permanent flexibility, Paladin answers a long felt need for a satisfactory primer for metals where conventional paints, lacquers, or enamels are of little value. Paladin provides excellent resistance to aromatic fuels, salt spray and humidity, and has good exterior durability. Thus, these remarkable protective properties enable Paladin to serve as a one-coat finish in itself.

This new material may be sprayed, dipped, tumbled, or roller coated, and either air dries in regular lacquer time or permits force drying or baking at temperatures up to 350° F.

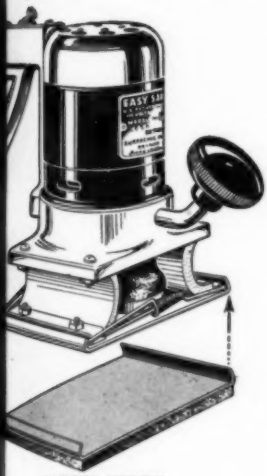
Where a product is assembled from parts made of several different metals, and where one finish is required over all, Paladin eliminates the need for different types of coatings and insures a uniformly satisfactory finish.

Because of government restrictions on the chemical raw materials used in Paladin, this new finish must be confined to the most essential end-uses. Write for complete information.

ROXALIN *Flexible* FINISHES
INCORPORATED
ELIZABETH • NEW JERSEY

"WHERE THE FINISH COUNTS USE ROXALIN"

Now, a New Model



MODEL "XLD"

"XLD" RECIPROCATING ELECTRIC *Easy* SANDER

with

Detachable Bottom Plate and Pad

This new Model "XLD" EASY embodies all of the features and rugged construction of Models "C" and "XL" which have won thousands of staunch friends, plus . . . a unique new method for INSTANT SNAP-ACTION ATTACHMENT OF THE SANDING PADS (See illustration). For maximum efficiency, sanding, rubbing or polishing applications require pads of correct size, shape and degree of flexibility. For instance, cleaning restricted areas of metal airplane parts . . . de-burring . . . rubbing, when a special pad is required for each grade of compound . . . instant change from wet to dry work . . . concave or convex surfaces . . . these are but a few conditions requiring special sanding pads.

sanding or rubbing curved or flat surfaces.

The EASY Sander does the work of two or three hand operators . . . a better finish, too, on even the closest tolerance applications, with inexperienced help, men or women. Perfect balance . . . all ball-bearing construction . . . two comfortable handles, assuring easy operation. Women operators prefer the EASY. Rugged construction for three-shift duty . . . sanding, rubbing, polishing . . . wet or dry . . . curved or flat surfaces.

Mail the Attached Postcard Today

DETROIT SURFACING MACHINE COMPANY

7434 West Davison — Detroit, Michigan

Synergism in Action

Synergism is new to industry, perhaps, but it is an old word th
has acquired a vital new significance for today and the days ahea

SYNERGISM, meaning forces working *together* to produce more than the sum of both working *separately,* can literally make 2 + 2 equal 5. True 2 apples plus 2 apples do not make 5 apples but an apple grower plus a chemist may make possible many more apples from the same trees and land.

In creating new products, in extending use for old ones, there is profound need for synergi and lots of it. When creative energy stimula action by another—minds click—greater n ideas are born beyond expectations.

At Zapon we are working synergistically amo ourselves and are anxious to so work with oth companies. It has produced results. Let's ta it over.

Synergism in an Airplane Propeller Finis

Wood of course is satisfactory for airplane propellers but finish of the surface is all important. Not only must the finish be tough to resist dust and the elements, it must prevent moisture absorption under sudden and widely varying temperatures and pressures—since a plane in a few minutes can soar from hot, humid sea level to cold, dry air two miles up. The finish must also control inside moisture content of the wood. It must fit fast production schedules.

Zapon SX-35 Finish was developed to meet these requirements through consultation wi propeller manufacturers. True synergistic thi ing and study solved this major problem. W are not propeller manufacturers—propell manufacturers are not finish manufacturers, b the right attitude of both put synergism work, with profitable results. Nor is the eff limited to the needs of a war emergency, f the same process that created the propell finish offers much for finishing new produc when peace comes.

ZAPON

ZAPON DIVISION · ATLAS POWDER COMPANY

Eastern Sales: Stamford, Conn. Western Sales: North Chicago, Ill.

INDUSTRIAL FINISHES

NINETEENTH YEAR OF PUBLICATION

Industrial FINISHING

Reg. U. S. Pat. Office

Published Monthly in the Interest of Modern Production Finishing

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Practical Publications, Inc., 1142 North Meridian Street, Indianapolis, Ind.

Eastern Representative: C. A. Larson, 254 West 31st Street, New York City; Phone Penna. 6-9049

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USE

RONCOLAC CLEAR R-637

A Shellac Replacement— not a substitute

Roncolac R-637 is extremely tough —more durable than shellac. It dries equally fast, is waterproof, has excellent adhesion, handles in every respect as easily as shellac. Roncolac Clear R-637 is not a hastily developed "war-baby." Because of its general all-around properties, many of which outperform Shellac, it will have a permanent place in the finishing field after the war. Order a trial lot. You'll want more!

Write for Full Details

RONAN

T. J. Ronan Co., Inc.

749 E. 135th St., New York City

Paints — Varnishes — Lacquers

Letters from Readers

Repairing Porcelain Enamel

In the January 1942 issue of INDUSTRIAL FINISHING, on page 7, paragraph 3, you indicate that you have given answers to problems in connection with chipped porcelain enamel and a substitute for aluminum powder. We are interested in these subjects and would be pleased to have you give us all the available information now on hand.—S. U. Co.

Information furnished.—ED.

Infra-Red Tunnels

We are subscribers to INDUSTRIAL FINISHING and we would like you to assist us with the following problem:

In connection with an extensive war contract for the manufacture of large packing boxes, we are in need of an infra-red lamp tunnel for the quick drying of the paint finish.

Because we have had no experience with such equipment and the sources of supply, we will appreciate it if you can send us, by return air mail a list of manufacturers of such equipment and preferably those whose set-up is such that they can send a sales engineer to our plant to make recommendations.—W. W. Corp.

Information supplied.—ED.

Silicate of Soda for Sealing Castings

In March 1943 issue of INDUSTRIAL FINISHING, we noticed, on page 34, an article in regard to the use of silicate of soda for sealing porous castings.

It would be greatly appreciated if you could give us the address of some concern who is making silicate of soda, brand E, as mentioned in the article

"SO SORREE!"

Tojo not yet buried

BUT WE are doing all we can to hurry the ceremony. If, in the meantime, we aren't quite up to par on service, you will understand and excuse, we are sure.

If you need any Protective Coatings on IMPLEMENTS OF WAR—WE'VE GOT 'EM! Olive Drabs, Primers, Sealers, Thinners, Airplane Dopes, Zinc Chromates and all Quality specification finishes.

V. J. DOLAN & COMPANY, INC.

Mfrs. of "Unquestionable Quality" Industrial Finishes

1830 N. LARAMIE AVENUE CHICAGO, ILLINIOS

I. C. D. FORMULA NINE

NON-INFLAMMABLE « *wax free* REMOVER »

for paint, varnish, lacquer, baked enamel, adhesives

EASY TO APPLY—NO AFTER-CLEANING

ORDER TRIAL GALLON AT DRUM PRICE

I. C. D. FORMULA 9 is the standard of safety and quality . . can be sprayed or brushed . . doesn't raise grain nor discolor . . quickly removes all kinds of finishes and coatings . . costs less to use . . saves time, labor and material.

SPECIALTY COATINGS—I. C. D. Labs. have specialized in the formulation and manufacture of non-inflammable coatings and substitute finishes. If you have a tough coating or finishing problem send in your specifications, finishing schedule and requirements. Immediate action and a prompt reply promised.

INDUSTRIAL CHEMICAL DEVELOPMENT CORP.

United's WAR COATINGS

NOW IN PRODUCTION USE ON THE FOLLOWING PRODUCTS:

AMMUNITION
AMMUNITION BOXES
ARMY TRUCKS
AIRPLANE PARTS
BELT BUCKLES
BOMBS
BUNK BEDS
COLLAPSIBLE OARS
COMMODES
DEGAUSSING BOXES
INSTRUMENTS
LAMPS (MARINE)
PANELS
PORTABLE MACHINE SHOPS
RADIO CABINETS
SIGNAL CORPS EQUIPMENT
TRANSFORMERS

The above is a partial list of the many war products now being finished with United's approved coatings. . . . If you have a war finishing problem write, wire or phone.

"Creators of Distinctive Industrial Finishes"

LACQUERS
THINNERS
ENAMELS
METALIZED FINISHES
SYNTHETICS

UNITED LACQUER MFG. CORP.
General Offices and Factory: Linden, New Jersey
New England Mfg. Division: Boston, Mass.

ONE "QUICKIE" SALVAGE JOB ISN'T ENOUGH . . .

YOU'VE JUST BEGUN TO SCRAP!

"Once over lightly" doesn't even *begin* to turn up the full scrap potential of the average industrial plant. Tremendous quantities have been either neglected or overlooked.
It's amazing what the second and third time around will yield when everybody is convinced that you mean business. Out they come—hidden tons of ancient parts and fittings, useless dies and jigs, everything from cotter pins to drill presses!

Use It—Sell It—or Scrap It!

Maybe you can't use some good machinery—yet it hasn't reached the scrap stage. Okay—sell it. Usually somebody else is looking for that equipment. You'll get prices far better than those for scrap. And you'll do your Uncle Sam a good turn into the bargain.

How to Sell Your Scrap

If you have no regular scrap dealer, find one in the classified phone book. He'll buy usable materials, too; or you can find a Used Equipment Dealer in the same place.
Don't expect your scrap heap to be a gold mine—the dealer works under a price ceiling, the same as you do. But you will find there's a million dollar feeling in the knowledge that you're doing your part all the way. It's 100% better than the guilty sensation you get every time you pass some good metal you should have scrapped months ago!

BUSINESS PRESS INDUSTRIAL SCRAP COMMITTEE

Room 1261, 50 Rockefeller Plaza,

New York City

If you have done a successful salvage job at your plant, send details and pictures to this magazine. Send for booklet—"Primer of Industrial Scrap."

for this purpose, and who could give us the formula necessary for the proper technique for various kinds of castings. We are particularly interested in the salvaging of some porous gray iron castings to seal them against leakage of lubricating oil.—L. Corp.

The company to whom to write is Philadelphia Quartz Co., 121 S. 3rd St., Philadelphia, Penna.—ED.

Wood Graining on Steel

We are large manufacturers of sheet-metal products and, although our production has been curtailed due to the present war conditions, we are nevertheless now making plans for the post-war period.

Would you kindly forward to us the names and addresses of your advertisers who manufacture materials and equipment for the application of imitation wood graining on steel? We are interested in hearing from manufacturers of all types, such as silk-screen stencils, decalcomanias, imprinting lacquer films, etched plates, etc.—K. Mfg. Co. (Heating and Cooling Equipment.)

Request granted.—ED.

Roller Coating Machines

SEND ME LIST OF ROLLER COATING MACHINE MANUFACTURERS SUITABLE FOR HANDLING ¼-INCH PAPER STOCK.—J. K.

Information supplied.—ED.

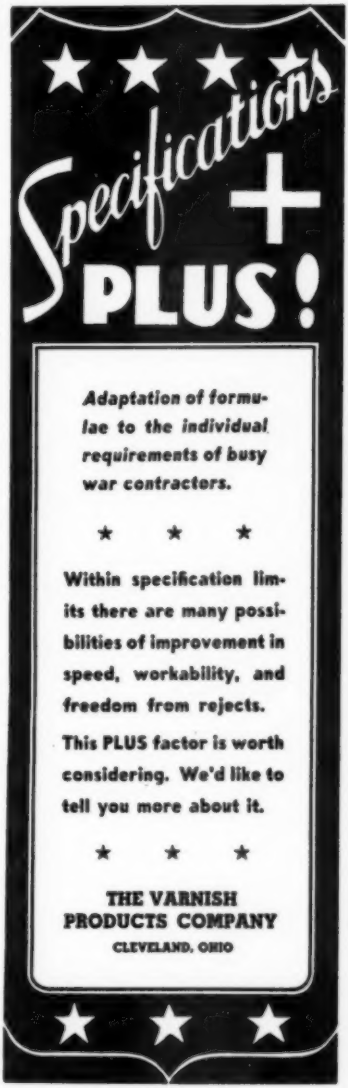
Cracks and Checks

Referring to April issue of INDUSTRIAL FINISHING Magazine, and the article on page 84, about "What to do With Cracks and Checks", we have this same problem and would appreciate a copy of the letter you sent to T. Mfg. Co.—K. C. Co. (Displays).

Information in reply to that question appeared on the same page—all excepting the names and addresses of manufacturers or suppliers of non-shrink putty; these we are sending you by letter.—ED.

Composition Ornament Formulas

I have been following the various letters answering the initial inquiry for composition ornaments, commencing in your Nov. 1942 issue, with great interest. The letter of C. H. Cooper (Dec. p. 80) and E. P. S. (Jan. p. 111) were of a substantial nature, whereas


Specifications
+
PLUS!
Adaptation of formulae to the individual requirements of busy war contractors.
★ ★ ★
Within specification limits there are many possibilities of improvement in speed, workability, and freedom from rejects.
This PLUS factor is worth considering. We'd like to tell you more about it.
★ ★ ★
THE VARNISH PRODUCTS COMPANY
CLEVELAND, OHIO
★ ★ ★

O'BRIEN
INDUSTRIAL FINISHES
Not the Most . . Just the Best
SINCE 1875

O'Brien laboratories have long been noted for outstanding developments in the field of industrial finishes. Included among the O'Brien products which are currently making news are:

- TRANSPORT AND AMMUNITION FINISHES (including Infra-Red Reflectance types)
- IMPROVED WOOD SEALER
- ZINC CHROMATE PRIMER
- PRE-FABRICATED HOUSE FINISHES
- RUBBER LACQUERS

Data Sheets on these and other industrial finishes are yours for the asking. Write. And ask us to quote on your requirements.

O'BRIEN VARNISH CO.
South Bend, Ind.

one writer (S. on page 80, Dec.) doubted the sincerity of the inquirer.

If you will be so kind as to forward my name or this letter to either of these or both writers, I would appreciate it. I am interested in a product of this type.

As a matter of fact, I have a formula for this wood dough or putty, but it involves the use of such difficult-to-obtain items as acetone, alcohol, etc. I am under the impression that I could consolidate several formulas (with the permissions of the owners, naturally) and develop a Victory Formula, aiding all parties concerned.

For the benefit of the initial inquirer, I wish to say that if he wishes to start producing small quantities of ornaments—and I presume he does—he can possibly obtain rubber molds or substitutes which will work out satisfactorily.

In the event I can be of further assistance, I will be glad to cooperate with anyone interested.—Arthur Skelly, 549 Empire Blvd., Brooklyn, N. Y.

Centrifugal Whirling Equipment

Kindly furnish information as to where I may purchase either new or used centrifugal whirling equipment for the application of paint to small parts.

I notice a similar letter of inquiry appearing in your December issue, in which reference is made to The Ronci Machine Co. I should appreciate all available literature from this company. —M. J.

Ronci's ad. appears in April issue, on page 94.—ED.

Order Your Finishing Materials Far in Advance

Your magazine has been read by me each month for the past 17 years, and I find it very useful—useful when I was a fledgling chemist and useful through the many jobs I've held since those days . . .

It just happens that I am . . . thoroughly involved with the priorities and allocations work that today goes along with the supply problem, common to all war plants.

May I offer a suggestion for your magazine? Hammer home to users of industrial finishes that they must place their orders for finishing materials 30, preferably 60, days in advance of the expected delivery date. Customers must cooperate with finish manufacturers more than ever, if they are to receive finishing materials that will be of top quality and give maximum service. The more important the customers' work, the more necessary for them to

(Continued on page 82)

★

Lacquers

Fillers

Stains

Enamels

Paints

What's Coming . . . .

While the problems of war require all the genius and strength of the nation, it is nevertheless certain that American Victory is assured; American standards will prevail; American living will point the way for world progress. This will require greater advances in research and inventiveness. Stille-Young expects to do its part in this program of peace as it has done and is doing its part for Victory in war.

★ *Use Stille-Young Finishes and "Finish with Confidence"*

THE STILLE-YOUNG CORPORATION

2300 North Ashland Avenue • CHICAGO, ILLINOIS

APPROVED IN PRODUCTION

Specialists? Yes!

SPEED THE WAR EFFORT WITH APPROVED FINISHES

We have turned idle plants, caused by finishing troubles, into full production with approved and tested finishing materials, through research and practical experience. Let us produce a finish that meets Government Specifications PLUS adapted to your present production methods. IT CAN BE DONE

Developments We Are Proud of—ALL FIRSTS

No. 1080 Water Can Interior Coating developed for QM Spec. No. 111-C — APPROVED IN PRODUCTION.

No. 60 Clear and Pigmented Water and Gasoline Can Coating developed for Marine, Navy, Army and Lend-Lease — APPROVED IN PRODUCTION.

No. 425 Black Enamel for Personal Hardware applied in production and approved by QM Laboratories — APPROVED IN PRODUCTION.

No. H-75 Sealing Seam Compounds for troublesome double seaming operations — APPROVED IN PRODUCTION.

No. 5-622-AXS-684 One Coat Dipping or Spraying on bomb fins and ammunition, etc. — APPROVED IN PRODUCTION.

AXS 736 Clear Shell Coating, dip or spray — AND MANY MORE TOO NUMEROUS TO MENTION.

GOVERNMENT SPECIFICATIONS IN PRODUCTION — Zinc Chromate Primers; Holabird, Maritime, Naval Ordnance, QM Corps, Marine Specifications.

We've Helped a Score of Concerns with Their War Production Finishing Problems. We Can Help You, Too! Write us.

THE SCHAEFER VARNISH COMPANY
Incorporated
LOUISVILLE — — KENTUCKY

Building a Pontoon Bridge on the 'Double-Quick'

ACME PHOTO

Airpainting Pontoon-Assault boat bottoms on the "double-quick" using Paasche Airpainting Equipment. ⟹

Type C-U-B
High-Production
Airbrush

Get the facts and you'll get this gun. It's fast—strong —easy to handle—weighs only 22 oz. Assures perfect atomization, so essential to high quality finish. Fully described in bulletin FM9-2.

ARMY engineers built this pontoon bridge (shown above) in "double-quick" time by working from both banks toward the middle of the stream.

Operator, in inset, is also doing a job in "double-quick" time, airpainting the bottom of a plywood Assault-Pontoon boat, used extensively by the U. S. Army Engineers.

The wide coverage, perfect balance, and light weight of the Paasche High Production Airbrush enable him to do quick work in applying a tough, protective coating—and to keep going hour after hour without hand or arm fatique.

The specially designed airfinishing booth provides adequate space for coating pieces of various sizes and assures safe, healthful working conditions. Paasche pressure feed material tanks, with lightning fast "Clamptight Covers" are great time-savers in material handling . . . Here is another Paasche installation speeding production of war material.

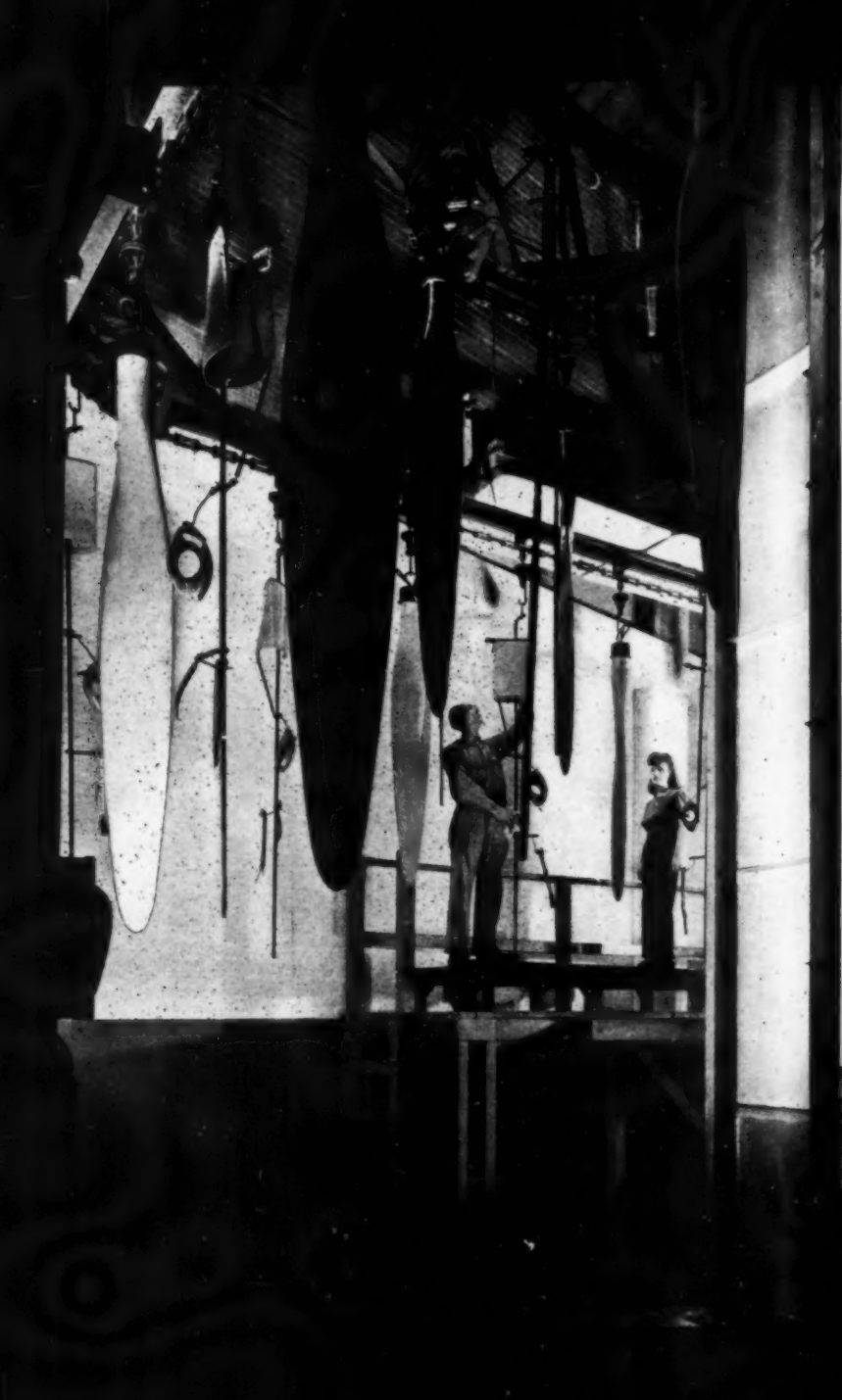
You may not be making boats but you are, undoubtedly, interested in getting maximum production in your coating and finishing department . . . Paasche equipment is the answer. Paasche Engineers are at your service. Write today for new literature on Paasche Manual and Automatic Airpaintirg Equipment—No obligation.

Paasche Airbrush Co.

1917 Diversey Parkway
Chicago, Illinois

Paasche AIRPAINTING EQUIPMENT

Manual, automatic and special airpainting equipment, airfinishing booths, pressure regulators, airconditioners for compressed air lines, air dusters and stripers.



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Curtiss-Wright's Set-up for Painting Propellers

BY E. F. THEIS
Plant Manager

AN industrial product-painting department that represents the last word in point of layout, equipment, methods, controlled processing and management, is in operation in the Curtiss-Wright Corporation's Propeller Division at Indianapolis, Ind. It is certainly a credit to the men who engineered its layout and construction. Some of those who assisted in this work include Mr. P. B. Terhorst, Plant Engineer; Mr. R. G. Nolte, Layout; and Mr. Wm. Loman of Engineering.

In the early stages of planning it was recognized that the cleaning and painting of metal propeller blades for aircraft is just as important as any other manufacturing operation performed on this essential product.

The space allotted for the paint department is well utilized but not crowded. Around three sides, partitioned walls extend from the floor to the roof, with glass windows to admit plenty of light. The fourth side is an outside brick wall. Along the inside part of this brick wall, a long narrow room is occupied by the mixing and circulating tanks and pumps, with space at one end for storage of incoming drums of material. This brick-walled room is the mixing room.

Directly above the mixing room is located air-conditioning equipment which draws air from the outside, filters and conditions it, and admits it into the paint room through suitable ducts. The mixing room is supplied with clean conditioned air as well as the paint shop—and the space within these rooms is under slight air pressure to prevent dust and dirt from being drawn in.

Equipment in the spray room includes six water-wash spray booths, one alkali washer with rinses, one dry-off oven, one primer oven, one finish oven, two batch ovens, one

Left—Here the blades are carefully alcohol-wiped and tack-ragged—after mechanical washing, rinsing and oven drying, and before spray-painting begins.

Below—On the assembly conveyor, moving from right to left. Final touch-up spraying, followed by infra-red lamp drying.

Leaving the dry-off oven, following the alkali washing and clear-water rinsing. Instrument at left is recording thermometer. (Reason for great height of overhead conveyor is to take care of various lengths of blades.)

infra-red heater bank, and one small degreaser for screws, nuts, rivets and similar small parts. At a desk in a central location, the paint department foreman has his headquarters from which he directs all activities in the department.

First Operation—A Thorough Metal Cleaning

As propeller blades enter the paint department they are hanging tip down from an overhead continuous power conveyor, as shown in the accompanying illustrations. The blades first move through an alkali washer where a hot alkali solution is thoroughly showered over them from high-pressure fan-shaped nozzles. The blades rotate as they pass through this washer. The hot water rinse, which follows, is also sprayed from nozzles of the same type. As the blades are conveyed clear of the washer they enter and travel through a dry-off oven wherein hot

air is circulated over them. A large dial thermometer gives visual evidence that the proper temperature of 150° F. is being maintained within this oven.

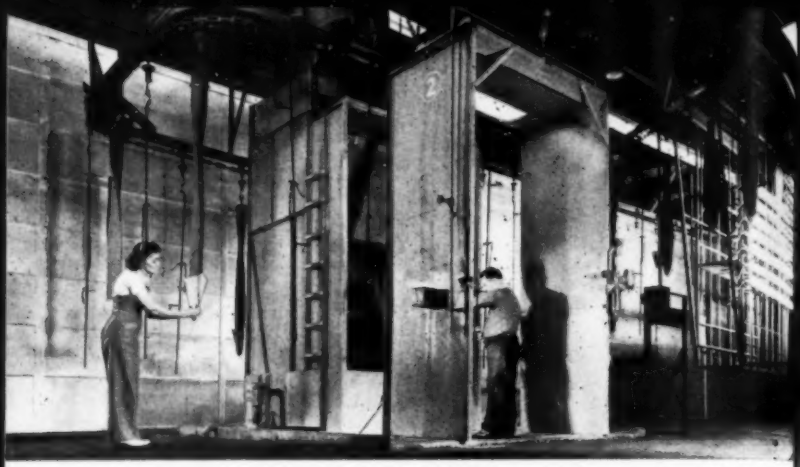
Because it is a known fact that cleaning compounds do not remove all traces of the various substances and types of grease which have become attached to the surfaces of metal parts during processing, an extra cleaning operation has been added. Between the dry-off oven and the prime-coat booth, space is provided where blades are hand washed with alcohol and dried with clean cloths. Following this hand cleaning, and just before they enter the first spray station, the surfaces of the blades are tack-ragged to remove any lint or dust particles. It is a case of being as careful as though the organization were finishing fine pianos.

Prime Coat; Baking; Finish Coat; Baking

Clean propeller blades enter a 12-ft. water-wash booth where they receive a light spray coat of zinc chromate primer which is sprayed on according to definite instructions. As they leave this prime-coat booth (still on the conveyor, of course) the prime coat is allowed time to air dry or "gas off" before the blades enter the baking oven. This oven has all the necessary controls, including a thermostat for visual inspection and control. The baking temperature for the prime coat is 180° F. Upon leaving the prime-coat oven, the blades are allowed sufficient time to cool before entering the finish spray booth.

In the 20-ft. finish booth two coats of specification non-reflectance paint are applied according to specific instructions which I shall explain later. A period of time to permit the coat of paint to air dry is allowed between the time the blades travel by conveyor from the finish

Propeller blades entering the alkali washing and clear-water rinsing chamber. Man at right is titrating the chemical washing solution. As the blades leave this washing chamber they turn and enter the dry-off oven which is partly shown on opposite page.



At left, you see masking lower part of blade to expose only the tip which is spray-painted in yellow. The yellow paint on propeller tips is quickly dried as blades move between banks of infra-red lights which appear at right.

spray booth to the finish drying oven. The finish drying oven is quite large, being 80-ft. long, 12-ft. wide and 15-ft. high. Blades travel by conveyor through the oven for 30 minutes, at a temperature of 250° F., to completely cure and harden the paint film. The oven has a recording thermometer on a control board for reference, visual inspection and control.

Masking and Painting Propeller Blade Tips

Following this oven baking of the paint film, the propeller blades are allowed 20 minutes to cool before they are masked, to permit spraying the tips with a coat of yellow enamel. This tip-spraying job also takes place in a water-wash booth. The masking is put on with tape and paper which can be used over and over again several times before being discarded.

Again a short interval of time is allowed for air drying the yellow paint on the tips before baking heat is applied. During this time a workman removes the masking and carefully positions the propeller blades (which are hanging tip down from the conveyor) so the tips will be in the proper position to pass between banks of infra-red drying lamps, for maximum drying effect. The infra-red drying tunnel is 15 feet long.

The paint job on propeller blades is now completed in the paint department and blades leave by conveyor at a high elevation, to other parts of the plant.

Controlling the Condition of Paint and Equipment

In practically all manufacturing processes final results depend largely upon the control that is exercised in the operation of all equipment—and upon the human element. Fortunately, in this establishment, the paint department was given every advantage when it was planned and laid out. The paint job is rated as being just as important as any other process in the manufacture of Curtiss-Wright propellers.

To control the most important element in the paint department, the storage space for paint is located in a heated room adjoining the room in which it is used, and a dependable

man of experience is in charge of all operations in this room. He is under direct supervision of the paint department foreman. A drum or can of paint is never opened until it has stood for at least 24 hours in this heated storage space. This period of storage has the effect of gradually conditioning the temperature of the paint in the container — increasing its viscosity if it has been brought in cold, or decreasing the viscosity if brought in too warm.

Stirring and Mixing Paint Before Use

When a drum or can of paint is brought from storage for use, it is positioned on end in a particular place provided for it and an air-powered motor is attached to the drum agitator shaft. This agitator is placed in motion and it continues to stir the paint in the drum until that paint is dumped into the circulating system. It may be as long as 10 or 12 hours or more. This stirring is not violent agitation, which might damage or destroy the properties of the paint, but it is sufficient to bring into suspension all of the settled pigment, thus assuring a thoroughly uniform mixture by the time the paint is ready for use.

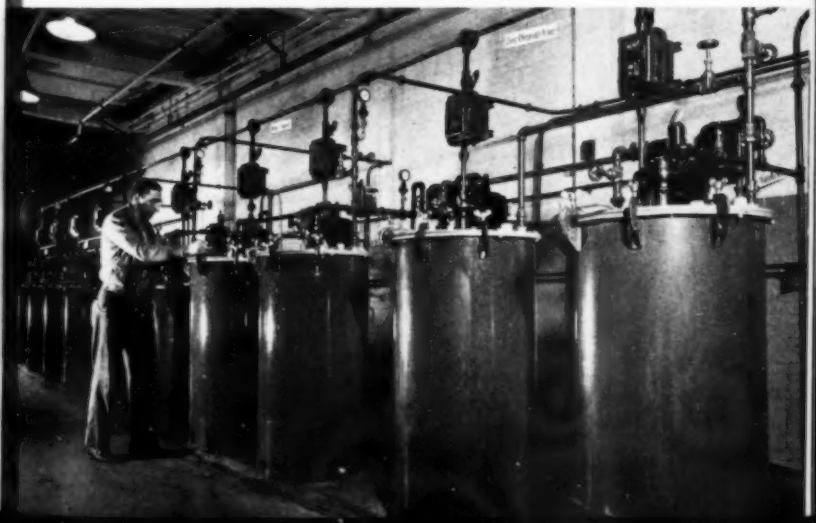
The drum of thoroughly mixed paint is lifted by an overhead crane and emptied into the mixing tank of a paint-circulating system which supplies spray guns at the proper spray booths. Another drum of paint is then brought in from storage to replace the empty drum, and the agitator is started to stirring its contents.

Thinner is now added to the material in the mixing tank, the kind and quantity being the proper proportion prescribed by the paint manufacturer. This material is then allowed to mix for a minimum of two hours before it enters the paint-circulating system.

Paint Is Tested and Forms Are Filled Out

At this point the paint is checked three ways. It is checked for temperature, which affects its viscosity;

Mixing and circulating tanks with their motors, piping and other accessories.



Two expert spray painters are at work here painting propeller blades as the blades move along by overhead conveyor through the water-wash booth.

a hydrometer reading is taken; and the viscosity of the paint is checked with a No. 4 Ford cup. Each one of these factors must be checked and must be just right if paint is to be really controlled and maintained in exact uniformity. If only two factors are just right, that is not sufficient for complete control.

A chart is furnished to record these readings. This filled-in chart shows all of the pertinent facts in written form and it is signed by the man who makes the tests. The form has spaces for the following entries, in the order in which they are given: Date; Batch Number; Temperature; Hydrometer Reading; Viscosity Reading with No. 4 Ford Cup; Signature of Tester; Time of Transfer.

After the material is checked and signed for, as being correct, there appears a heading which reads: "Time of Transfer." This refers to the exact time the paint was transferred from the mixing tank to the circulating lines and tank. The reason for this particular sequence of entries is to enable the management to trace down any trouble that may occur, and to determine quickly whether it is paint trouble or oven trouble. This can be done by comparing the oven charts with the paint-mixing charts.

The mixing room has five double-tank circulating-pump systems which circulate the paint through pipe lines to the various booths and back again to the circulating tank. At each spray station a fluid pressure regulator is provided to control the pressure required. The pumps are provided with pressure gauges for visual control. These controls cannot be adjusted by anyone except the man in charge of the mixing room, and he does this only when ordered to do so by the department foreman. No one is allowed in the mixing room except the man in charge. He is in absolute control of all operations therein, subject only to orders from the department foreman.

Fluid Regulators; Atomization Pressure

All fluid regulators at spray stations are provided with pressure gauges and are adjusted with a deep-socketed key. The department foreman is the only person who has such a key, and he personally sets the pressures at all of the stations. The atomizing air is also controlled and set by the foreman, who adjusts it at one master regulator located above each spray booth. An air header having sufficient volume balances the air to all spray guns that operate at the same pressure. With the volume of air available in the

large pipe, the air pressure for atomization at the spray gun is low. A fluid pressure of 8 lbs. is used. This fluid pressure, with 45 lbs. atomization pressure, gives satisfactory results, with little rebound or fog during spraying.

Another vitally important thing is being done here — and it is one that other manufacturers could and should do. *Every stroke made to spray a propeller blade is controlled. A definite procedure of painting each part is prescribed and insisted upon by the department foreman. Every operator uses these same strokes. Every operator uses the same spray gun, cap, fluid tip, air pressure and speed. This results in better and more uniform work, with fewer rejects.*

Maintenance and Inspection Help Head Off Trouble

When any equipment gets out of adjustment or out of order, and when the washers need attention, the foreman summons his maintenance man whose sole job it is to attend to all of the equipment in the spray room. This man takes care of it immediately. A constant watch is kept on all gauges and thermometers to make sure that no changes are taking place. The washer is titrated (its solution is analyzed and brought up to strength if necessary) every hour and the readings are recorded on a chart. The performance of a power washer for cleaning metal surfaces is no better than the condition of the solution that does the work.

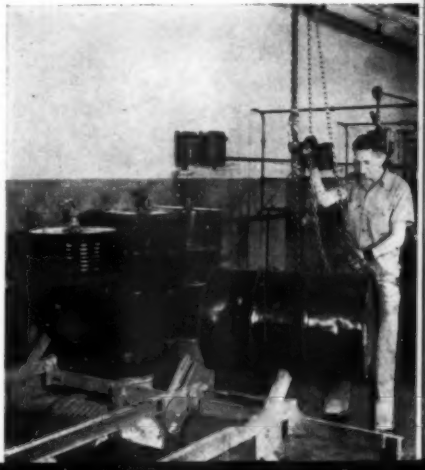
The spray booths are titrated every four hours and recorded. Sludge is removed and compound is added every four hours. Gauges, thermostatic controls and charts are all inspected at regular intervals by the maintenance man. If any irregularities are noticed, they are reported to the foreman promptly. Replacement spray guns and parts are always available for immediate use. Spray operators are not allowed to repair their spray guns.

Cleaning and Painting Small Parts

A small degreaser is used for cleaning small parts such as nuts and bolts. These parts are prime coated with zinc chromate primer and finished black. Girls arrange them for painting. Also, there are many other medium-small size parts most of which must be masked. Work tables are provided where this masking is done. These parts are handled on trays, although in the spray booth the sprayman may have to handle each part separately to make sure of full coverage inside and outside.

Small and medium-small parts are spray painted in an 8-ft. water-wash spray booth. The parts arrive on a large portable rack from which the trays are removed and returned

Where incoming drums of material are received in the mixing room. Each of the three drums in upright position has an air motor attached to turn an internal agitator which continually stirs the contents. Drums are moved into this position, and later to the mixing tanks, with an overhead hoist.



after painting. The portable racks are always squared off in an area provided for them, so as to utilize all of the space and at the same time avoid congestion. As a portable rack is loaded with freshly sprayed parts it is moved into a batch oven. All ovens are equipped with recording thermometers for proper control of heat and baking time.

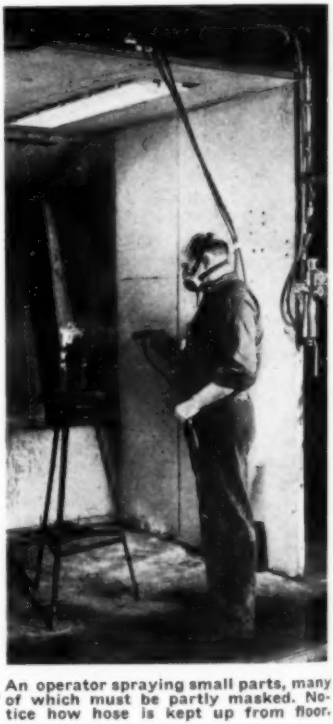
A Clean Paint Department Is Order of the Day

The entire paint department is closed to all except those who work there. Materials and other items, such as containers, tools and the numerous other possible things that are temporarily left in the department for no good reason, are not allowed to remain. These articles would clutter up the department, occupy valuable space and collect dirt. The floors of the paint department are kept as clean as those in any laboratory. It is realized that dirt and dust will prove harmful to the work in the best paint departments, therefore this paint department is really kept clean at all times.

Foreman Is in Key Position To Oversee All Operations

One of the most significant features about this paint department is the way in which it seems to be "built around the department foreman" who exercises control of all operations. This is as it should be for maximum results. From his desk the department foreman can observe 90 per cent of all operations. He can see the propeller blades enter his department. He can see the metal-cleaning equipment, the ovens and all of the spray booths except one; and he can look over at the work tables and the small-parts booth. He knows at all times just how the work in his department is progressing and he can promptly convey this information to the management, production planning, assembly, or other departments. He can observe if the proper spray strokes are being made on the blades as specified, which is an important item of production painting control.

A quick inspection trip through the mixing room and around the equipment, where everything is fitted with tell-tale gauges and thermometers, enables him to learn just how things are going at any moment of the day. Or, he can call in one of his assistants to report on the operation of any or all the equipment or material mixtures. He can



An operator spraying small parts, many of which must be partly masked. Notice how hose is kept up from floor.

compare charts and quickly locate any trouble that may show up.

"Prepare for trouble and you will avoid it," is the motto followed here. In this paint department practically every contingency has been anticipated and provisions have been made for avoiding those troubles that occur so often when things are left to chance. If any trouble does develop, even in the face of these many precautions, facilities are available for tracing it down and correcting it promptly.

To those who may feel that our surface-cleaning and painting department has gone further than is necessary with control, my reply is that any well-operated paint department, where quantities of high quality merchandise are painted, should incorporate all of the practices that prevail in this department. The control of the painting job is neither overdone nor has any important feature been neglected.

Protective Coatings Are Essential

THE PAINT, varnish and lacquer industry has demonstrated not only its efficiency but its loyalty in the war program, giving our Government its full co-operation. Paint, varnish and lacquer manufacturers are really on an all-out-for-victory basis of operation. They have voluntarily discarded "business as usual" for the duration. In many instances they have changed and expanded their plants at maximum speed to serve both the war and civilian needs at the same time. This has caused many hardships and an enormous expense, but they have accepted this additional expense, plus the imposition of severe restrictions and priorities without question—an indication of their determination to help win the war as soon as possible, which is the aim of all Americans.

Practically every piece of modern war equipment has adequate protective coatings, supplied through the genius and co-operation of the paint industry. This industry has responded nobly to every request our Government has made for the best protective coatings available. The paint industry has pledged itself to do everything in its power for victory, and it is carrying out that pledge.

Likewise, the industrial users of protective coatings have their equipment and organizations tooled up to use these vitally important materials effectively and economically. Really I believe that product painting and the preparation of surfaces to receive paint coatings have become better established on a more scientific basis than ever before. Even the general public has come to realize that paint coatings are useful for something more than decoration and sales appeal. Paint coatings, properly formulated and used, serve to protect and preserve the usefulness of most products employed in the conduct of war. They are definitely essential. This fact is probably appreciated more today than ever before.—H. W. CHESTER.

Balanced Lighting Needed

During the concentrated effort of converting plants into war production at the time of the Pearl Harbor disaster, many of the smaller details were not taken into consideration—such as balanced lighting equipment.

One factor to which we can never give too much attention is eyesight. Ways and means of increasing the efficiency of the operators' eyes are the problems of the seeing specialists.

Fostoria Industrial Service has specialized in production lighting problems, as well as maintaining lighting engineers to handle and answer various problems in this line.

Conveyorized Infra-Red Bake-Finishing Line

THE automotive and appliance industries are among those that have long been known for their development and adoption of progressive manufacturing techniques. Many of them have daringly pioneered advanced methods and equipment in order to be sure of making uniformly high quality products in greater volume and at lower cost per unit. They have observed the same principles of progress in arranging new set-ups for the production of war work.

At the outbreak of war, Nash-Kelvinator Corp., in converting its many plants from peacetime to war production, encountered a number of finishing problems requiring prompt and effective solutions. One such problem concerned the acceleration of finish drying and baking schedules on propeller blades and parts. Finish quality specifications were exacting, and factory space was at a premium.

The men responsible for production plans knew something about the possibilities of radiant energy, or "infra-red" as it is commonly known, for various classes of industrial heat-processing operations requiring work temperatures below 500° F. Prior to Pearl Harbor, infra-red equipment was in use by most manufacturers of automobiles and appliances, and the majority of the installations were made for the purpose of high-speed paint drying and baking.

Accordingly, it was decided to employ infra-red extensively for paint-drying operations. A modern R-C (radiation-convection) type of oven was installed, and finish-baking schedules were set up. As the rapidly-expanding aircraft industry multiplied its output of bombers and fighters, month after month, and as the demand upon Nash-Kelvinator's facilities increased proportionately, additional high-speed ovens were installed on their finishing lines.

A typical Nash-Kelvinator finish baking installation is illustrated by the accompanying diagram of the

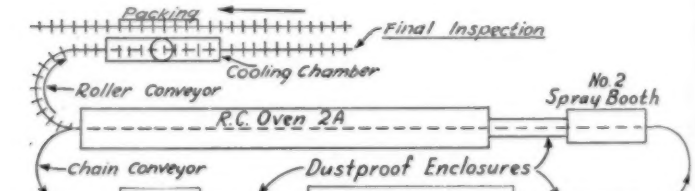


Fig. 1—Plan of conveyor line through two spray booths, two infra-red ovens, dustproof enclosures and cooling unit—for painting prime-coated metal parts.

Fig. 2—In the foreground are two infra-red ovens through which a conveyor carries metal parts that have been spray-painted. Dustproof enclosures hide the conveyor from view, but it can be seen in Fig. 3.

Spray booth No. 1, in background, is where the first coat of enamel is sprayed. Then the conveyor carries all spray-painted parts through oven 1A.

Back of the observer the conveyor makes a hairpin turn, comes through another spray booth and moves on through oven 2A, as also shown in Fig. 1.

layout, and two photographs. In this case a twin-oven layout is in operation for continuous baking of two separate finish coats on control governors for variable-pitch propeller mechanisms. The finish is a synthetic grey enamel of the modified-alkyd type. A plan of the layout is revealed in the diagram marked Fig. 1.

In the view marked Fig. 2, you see two conveyorized ovens side by side. At the spray booth No. 1, in the background, the work receives its first enamel coat over zinc chromate primer. Then it proceeds by conveyor toward the observer, passes through oven 1A (16-kw) at left where the first coat is baked to a "setting" condition. After leaving this oven the conveyor makes a hairpin (180°) turn, and carries work through spray booth No. 2 (see Fig. 1) for application of the final coat. The final coat is then fully baked in the 32-kw. oven 2A, which appears at the right in Fig. 2.

The view marked Fig. 3 shows the work entering oven 2A, after receiving its final enamel coat. (Oven 1A appears in the background. At lower left you see part of the pressure tank used at spray booth No. 2.) This section of the conveyor is covered with a dustproof enclosure (shown here with side panel re-

moved) to prevent dust from settling on the work as it moves along. Oven 1A has two similar protective enclosures.

Referring further to Fig. 3, the enclosure at extreme right, below large-diameter stack, is a cooling chamber for reducing the temperature of oven-dried parts to the point where they can be handled promptly after final bake. The work pieces, being of a massive character, will retain heat over an extended time interval, consequently they require forced-cooling if conveyor space and production time are to be saved.

All wiring and electrical parts are outside of the two heating chambers. Fumes from each oven are exhausted by positive sirocco-type blowers, through dampered exhaust stacks. The entire conveyor-oven system can be controlled by a single push-button station mounted at the entrance end of oven 2A.

The R-C (radiation-convection) type of enclosed infra-red ovens were engineered, built and installed especially to conform to the Nash-Kelvinator product, finish, and factory space specifications, so as to develop a compact and effective bake-finishing layout.

Note: Facts and illustrations for this article were furnished through courtesy of C. M. Hall Lamp Co., Radiant Heat Div., Detroit, Mich.

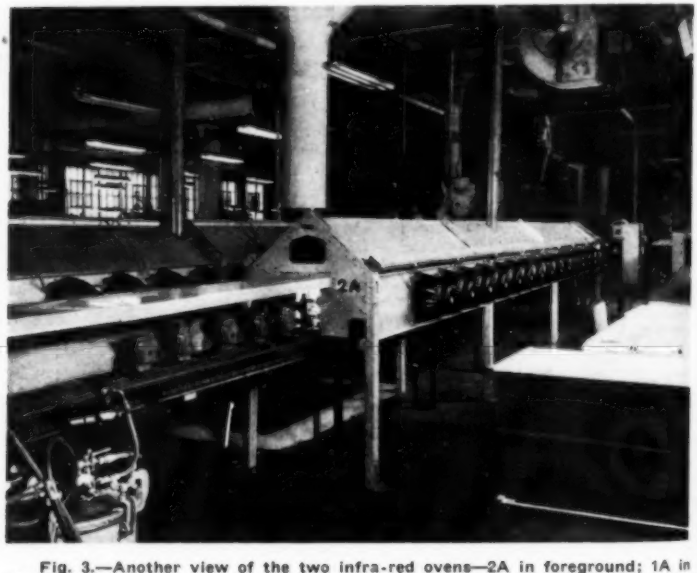


Fig. 3.—Another view of the two infra-red ovens—2A in foreground; 1A in background.
At left, the side panel is removed from dustproof conveyor tunnel to show parts traveling from spray booth No. 2 to entrance of oven 2A.
At lower left-hand corner, you see top of material container.
At extreme right, you see part of the cooling unit and roller conveyor.

Some of the war products you are making may land in the Arctic Circle—others in the humid jungles of the South Pacific or on the parched sands of North Africa . . . What sort of protective coating should they have?

Murphy has the answer, as shown by the impressive variety of war products for which Murphy Protective Coatings are being used. For example:

Airplanes	Searchlights	First Aid Boxes
Commando Ramps	High-precision Instruments	Propellers
Communication Sets	Ship Fittings	Gunstocks
Gas Masks	X-Ray Equipment	Sterilizers
Gliders	Shells	Snow-shoes
Optical Apparatus	Trucks	Health Lamps
Plywood Assemblies	Machine Tools	Navy Lockers
Range-finders	Dental Equipment	Sound Detectors
Ration Cans		Ammunition

Yes, indeed, you can be sure that Murphy Protective Coatings have passed every essential test—not merely in the laboratory, but in the field . . . not only in war-time, but also in peace-time . . . not on just a few products, but on a great variety of articles shipped to many parts of the world.

This background of experience is at your service, both for war requirements and civilian production.

Put it up to Murphy

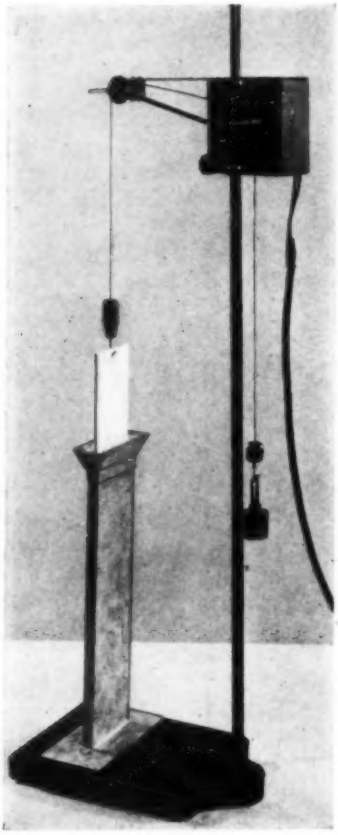
Write our nearest office

MURPHY VARNISH COMPANY

NEWARK SAN FRANCISCO CHICAGO

MURPHY Protective Coatings

Uniform Film Thickness on Dip-Coated Products



The Fisher-Payne dip coater used for dip-coating small test panels.

Development of the laboratory dip coater and the exercise of careful control on all factors that affect the dip coating of test panels, have made it possible to establish a number of vitally important facts which govern the film thickness and uniformity of various types of coatings applied by dipping.

BY H. F. PAYNE
American Cyanamid Co.

MANY complaints on paints, lacquers, etc., have been traced to *differences in application conditions of the buyer and seller* instead of faulty material. Differences in film thickness or irregularities in film thickness have long been recognized as one of the principal reasons for the trouble. The Bell Telephone Laboratories found it necessary to develop an automatic spraying machine to coat their test panels uniformly in order to get reliable results. A survey of the industry by the New York Paint and Varnish Production Club showed that machine application of coatings on test panels is essential for accurate, reproducible testing.

A number of dipping machines

"DEOXIDIZE" for varnish finish with the

New "170" type ACP DEOXIDINE

Whether you are preparing steel artillery shell cases, or any other metal product (except zinc) for varnish or paint finish you should investigate the new "170" type DEOXIDINE. For use in a dip operation, at either high or low temperature, to remove light annealing scale—thus eliminating an extra pickling bath—and also to perfectly prepare the surface for the paint finish, all in one simple operation.

Samples and directions for use sent upon request.

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have been used for testing, but in general they are not simple in construction or operation. We thought, therefore, that the development of a simple dip coater, which could be made available to all surface coating laboratories, would be a valuable contribution to our industry. After considerable experimentation at the Research Laboratories of the American Cyanamid Co. at Stamford, Conn., a model, as shown in the accompanying illustration, was designed in cooperation with the Fisher Scientific Co. of Pittsburgh, Pa. This instrument is now available commercially by that company.

Dip Coater Developed for Coating Test Panels

The instrument consists of a small constant-speed motor which rotates a stepped-cone pulley having three different diameters. This gives three speeds at which the test panels are withdrawn from the dip tank. These rates of withdrawal (2, 3 and 4-in. per minute) were found to give films of uniform thickness over the entire length of a 12-in. panel, with a wide variety of surface coatings. A weighted cord is given one wind around the stepped pulley to prevent slippage and then over the loose pulley. The panel is hung on one end of the cord and a counterbalance weight is fastened to the other end. This balanced system is necessary to eliminate any appreciable load on the small motor. *Rates of withdrawal greater than 4-in. per minute were found to give films of irregular thickness*, as shown in the graphs.

The dip tank with the flaring top, as shown in the illustration, was designed to hold the smallest amount of paint for the 3x12-in. panels used. The rectangular body is only slightly larger than the panel, which makes it difficult to withdraw the panel without having it rub one of its edges against the tank. The paint in the flaring section forms a "well" through which the panel moves and prevents it from being marred by any rubbing in the rectangular section. This tank requires only ¾-pint of sample material for coating 3x12-in. panels.

A great many coatings have been tested successfully with this instrument. These include alkyd white baking enamels, olive drab lusterless paints, and clear coatings of various types including synthetics, lacquers and varnishes.

Drying Schedules; Dipping

The films were dried under the following conditions before making film thickness measurements: Two alkyd white enamels (No. 1 and No. 2) were baked for one hour at 265° F. Another white enamel (No. 4) of different formulation was baked for half an hour at 265° F.

The olive drab lusterless coating and several different clear coatings (synthetics, varnishes and lacquers) were allowed to air-dry 48 hours. The air-dry condition was maintained constant at 78° F. and 50% relative humidity. Another clear coating (No. 6) — a non-oxidizing alkyd plasticized urea-formaldehyde baking finish—was baked 15 minutes at 350° F.

Cold-rolled steel panels, 3x12-in., were cleaned thoroughly with toluene and dried by compressed air which was free of oil or moisture. The clean panel was hung on the hook attached to the cord and lowered by hand into the container of surface coating. The motor was then started and the panel was withdrawn at a rate dependent on the position of the cord on the stepped-cone pulley. All panels were dipped at a constant temperature and humidity (78° F. and 50% relative humidity) and maintained in a vertical position until dried. *(to p. 30)*

Enthone

ENAMEL STRIPPERS*

WORK CLEAN AND FAST

The above panel shows how fast Enthone Enamel Strippers go to work.

Panel *"A"—Original enamel of urea-formaldehyde type*
Panel *"B"—After one minute in stripper*
Panel *"C"—After two minutes in stripper*

Notice that the enamel lifts away from the surface, leaving it clean and unattacked.

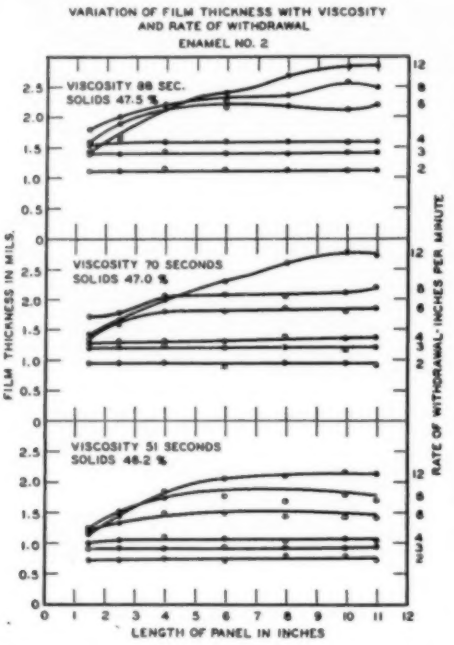
Enthone Enamel Strippers do not attack any base metal or anodized coatings.

Consult Enthone for stripping synthetics, japans, lacquers.

THE ENTHONE CO NEW HAVEN CONNECTICUT

REPRESENTATIVES IN PRINCIPAL CITIES

*Protected by U. S. Patent No. 2242106


VARIATION OF FILM THICKNESS WITH VISCOSITY AND RATE OF WITHDRAWAL
ENAMEL NO. 2
VISCOSITY 88 SEC.
SOLIDS 47.5 %
VISCOSITY 70 SECONDS
SOLIDS 47.0 %
VISCOSITY 51 SECONDS
SOLIDS 46.2 %
FILM THICKNESS IN MILS.
RATE OF WITHDRAWAL-INCHES PER MINUTE
LENGTH OF PANEL IN INCHES

Results of tests, as indicated on these three typical charts, show that the slower the rate of mechanical withdrawal and the thinner the material (lower in viscosity), the thinner the film thickness of the coating; but this coating is uniform in thickness all over the panel, as indicated by straight lines through seven points at which film thickness measurements were taken.

To get a thicker film and still keep it uniform in thickness at all points, the viscosity of the material can be increased (see charts at middle and top) and the speed of withdrawal can be slightly increased too, but no more than 4-in. per minute. At higher rates of steady mechanical withdrawal, (6, 8 and 12-in. per minute) you see variations (see curved lines in charts) in the film thickness, as measured at seven different places along the 3x12-in. test panel.

Hand dipping also produces variations in film thickness as indicated by other tests made and charted.

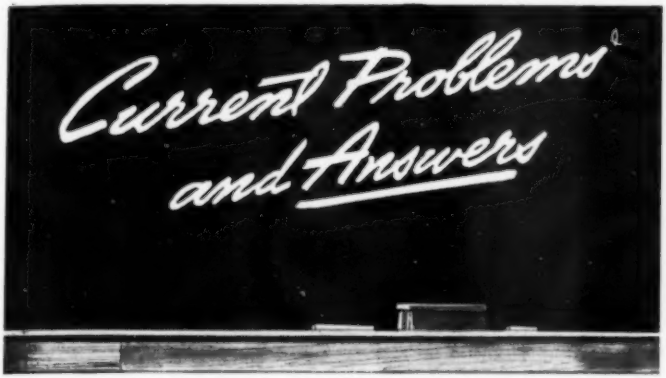
The film thickness was measured with an Ames dial gauge at seven positions over the length of the panel. The coatings were used at three viscosities (seconds on No. 4 Ford cup) with the corresponding variation in percent of solids content (see sample charts).

Examining the Graphs

The graphs for Nos. 1, 2 and 4 enamels show that uniform films are obtained at withdrawal rates of 4-in. per minute or less, but the films are irregular at the faster rates (for example, at 6, 8 and 12-in. per minute). Comparison of the slow-setting enamel No. 1 with the fast-setting enamels No. 2 and No. 4 show that better results are obtained with No. 2 and No. 4. This is in line with the well-known fact that relatively fast-setting is required for good dipping enamels. Good results are obtained with the highly pigmented olive drab lusterless paint, showing that a wide range of pigmented materials may be used provided the vehicles are such that good dipping is obtained.

The effect of fast and slow setting is shown again in the graphs for the clears. A comparison of the results obtained from panels dipped by hand and by the mechanical dip coater shows the value of this little instrument when making test panels.

Clear coating No. 6 was tested for use in specification AXS-736 for shell case finish. This specification requires dipped panels for test and



Problem No. 6 — The Government Man Has His Troubles, Too . . .

The man behind the desk in Washington—whether he wears the O. D. of the Army, the Blue of the Navy or is still in civies—has his production problems, too. It's his job to find the coating that will meet requirements specified by armed forces in the field.

Here's How We Can Help Him

We can work with him or with any finisher designated by him in developing exactly the correct coating for any material: metal, wood, composition board, paper or fabric. Since the beginning of the war, our laboratories have been cooperating closely with Government agencies as well as manufacturers of Army and Navy equipment in creating protective coatings with specific characteristics. Whether you are a Government man or a manufacturer, tell us your difficulties—it's our job to help you work them out.

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Give us your metal coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

a film thickness of 0 6 mils, plus or minus 0.1 mil. It will be obvious that this could be done quite readily with the mechanical dip coater, by simple adjustment of viscosity and the rate of withdrawal from the dip tank. Since the viscosity changes considerably with temperature, care should be taken to record the temperature of the coating when dipping. It would be better to maintain a standard temperature and humidity for all testing; for instance, 78° F. and 50% relative humidity are most generally used.

It is well known that protective coatings give their best service when applied at a fairly definite and uniform film thickness. The best thickness for any specific coating has been determined by making a series at different thicknesses and testing them under the required service conditions, such as: resistance to salt spray, soap solutions, abrasion, etc. The value of the mechanical dip coater for making such a series of test panels is doubly appreciated because it is so simple in adjustment of viscosity and rate of withdrawal.

When testing a series of enamels over a primer it is important to have the prime coat exactly the same on each panel. It is evident that any number of panels could be primed by this method by simply maintaining constant dipping conditions. The large majority of test panels are 6 to 12 inches in length and the mechanical dip coater was designed to handle these sizes. In the testing of coatings on paper or textiles it may be required to coat longer strips, in which case, a special pulley can be obtained for this work.

Summary of Results of Tests

The dip coater was designed to provide a simple standard method which could be specified to coat test panels by dipping. The thickness of the coating will be substantially uniform over the entire panel. *The actual thickness obtained will depend on the viscosity of the coating and rate of withdrawal of the panel from the coating, if the temperature is constant.* Better results are obtained with fast setting coatings, but the instrument may be used successfully with the large majority of coating materials. The data on viscosity and film thickness for the coatings given in this article should be used as a guide. The actual dipping conditions for a required film thickness should be determined for any specific coating.

Results of tests, as indicated on these three typical charts, show that the slower the rate of mechanical withdrawal and the thinner the material (lower in viscosity), the thinner the film thickness of the coating—but this coating is uniform in thickness all over the panel, as indicated by the straight lines through seven points at which film thickness measurements were taken.

To get a thicker film and still keep it uniform in thickness at all points, the solids content and viscosity of the material can be increased (see charts at middle and top). And, the speed of withdrawal can be slightly increased, too, but not more than 4-in. per minute. At the higher rates of steady mechanical withdrawal (6, 8 and 12-in. per minute) you see variations (see curved lines in chart) in the film thicknesses, as measured at seven different places along the 3x12-in. test panel.

Hand dipping also produces variations in film thickness, as indicated by other tests made and charted.

NOTE: Additional and more specific technical information about the exact composition of coating materials used in these tests is available in the author's files, and can be furnished on request.

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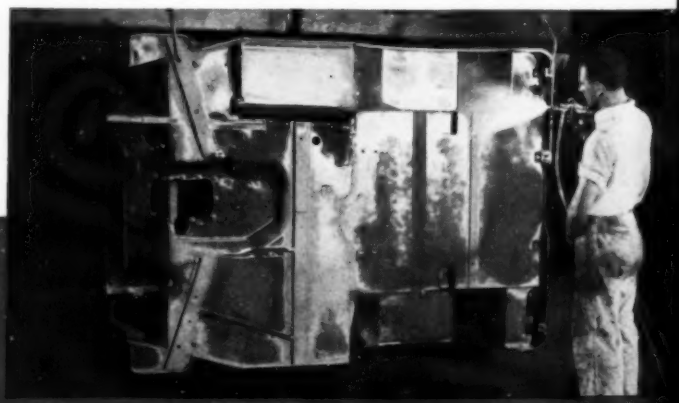
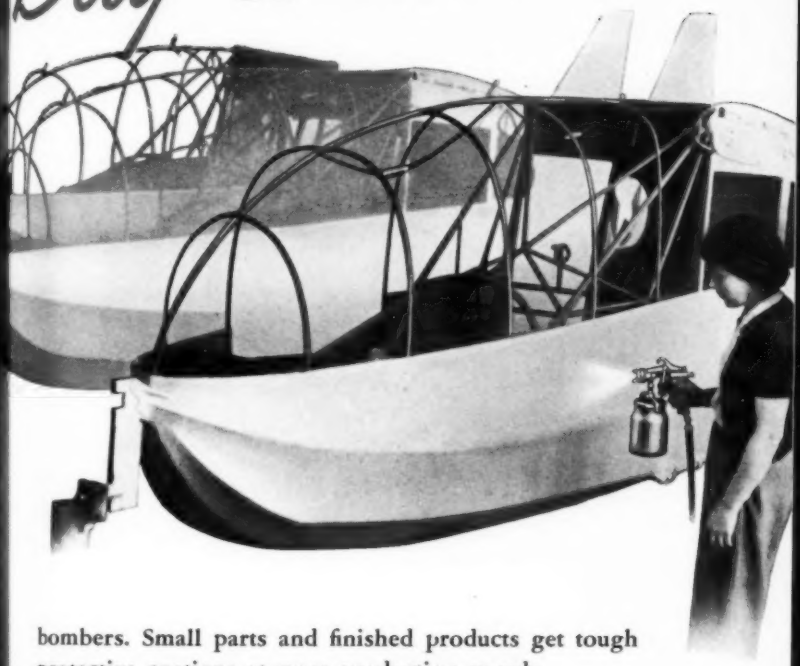


Day "to Berlin



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Here are shown actual photographs (unretouched) of panels finished with PEBBLE-TEX. Above shows coarse texture.

This panel shows a finer texture. The size of the pattern is regulated by spray gun adjustment and application technique.

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R. Neil Dalton

R. Neil Dalton
Chief Chemist.

Routine Control Tests on Finishing Materials

Chief chemist in big furniture factory tells why careful tests should be made on all finishing materials received, advises what tests to make, explains how to make them and reveals what they mean to finishers.

BY R. NEIL DALTON

IN RECENT years, manufacturers of furniture have shown an increasing interest in the quality of finishing materials. No longer is the wise finisher satisfied that a material is the best obtainable just because one or two cases look good. This has led to the retaining of consulting chemists or the establishment of laboratories within the plants of the more progressive manufacturers.

Today the need for laboratory checking of materials is more important than ever, to keep track of substitutes which find their way to the purchasing agent. At the same time, the shortage of equipment and trained personnel make the establishment of a laboratory difficult. With this in mind, a series of tests have been adapted for the use of the head finisher or other men experienced in finishing.

These tests are designed to find weaknesses of various materials before they enter the finishing room and disrupt production. In many cases money is saved by avoiding delay, and refinishing costs which frequently accompany the usual plant test. In other cases, a careful study of test results will enable the finisher to make recommendations which will permit the use of an otherwise unsatisfactory substitute.

A word of caution should be added at this point. While it is permissible to reject a material without a plant trial, the final okay of materials which pass these tests should be withheld until at least a drum of material has been tried in the plant.

Certain of these tests may well be run on every batch of material re-

ceived from the manufacturer. These tests have been marked with an asterisk. This method of control is particularly important now that manufacturers of finishing materials are hard pressed by material and labor shortages.

Make Plenty of Notes When You Make Tests

There are several general laboratory procedures which should be adopted by any finisher testing materials. They sometimes seem laborious but will prove their value in the end. The first and most important is to keep a written record of each test. This need not be elaborate but should contain the following information: Material, manufacturer, lot number, date received at plant, date tested, tests run, and a few words to describe the results of the tests. A little writing will save one the trouble of re-running a test because the exact results were forgotten. The safest practice is to have your notebook beside you as you make the test, and write your ideas in immediately. Don't worry if the notes look dog-eared. They are for service, not beauty.

It is recommended that a written report be given to the men responsible for purchasing and using the new materials. The tester's ideas are then a matter of record if any discussion arises at a later date. The written report is not a great hardship, as it should be brief and can be dictated to a girl in the office.

How to Test New Materials

All testing should be done carefully and each material should be tested under as nearly identical conditions as possible. Generally, it is possible to test a new material against an acceptable standard. The direct comparison often shows differences which might otherwise be overlooked. Finishing out a panel according to plant schedules, including all steps, using the new material on one side and the standard on the other neutralizes differences in wood, uneven spraying, and other variables which enter into finishing. By all means, be careful, for you are going to rely on your own results.

Mark all panels with the name, number and manufacturer's name of each material used, as well as the date and time of application. This procedure prevents mixing panels. This information may prove valuable a year hence, too.

Testing Stains for Color, Strength and Permanence

The standard method of testing stains for color*—that is, dipping a strip of paper in a solution of each—is hard to beat. Remember, though, to be careful in making all weighings. The strength* of stains should also be noticed during this test. That is, the amount of stain powder required per volume of solvent to give the desired color. Notice, also, if any of the stain powder is insoluble.*

Since colors change on aging, standards should be stored in a dark place. Also, renew the standards at least every six months. Testing new stains for light permanence is frequently omitted. This is most readily done by staining a panel, cutting it in half and setting one-half in an office window that has southern exposure. The other half is wrapped in brown paper and stored in a closet. At various intervals the halves are inspected for color change. This test can be made more rapid by building a box with a glass front and setting it on a roof facing south and sloping at 45°. The sides should be baffled to pre-

*These tests may well be run on every batch of material received.

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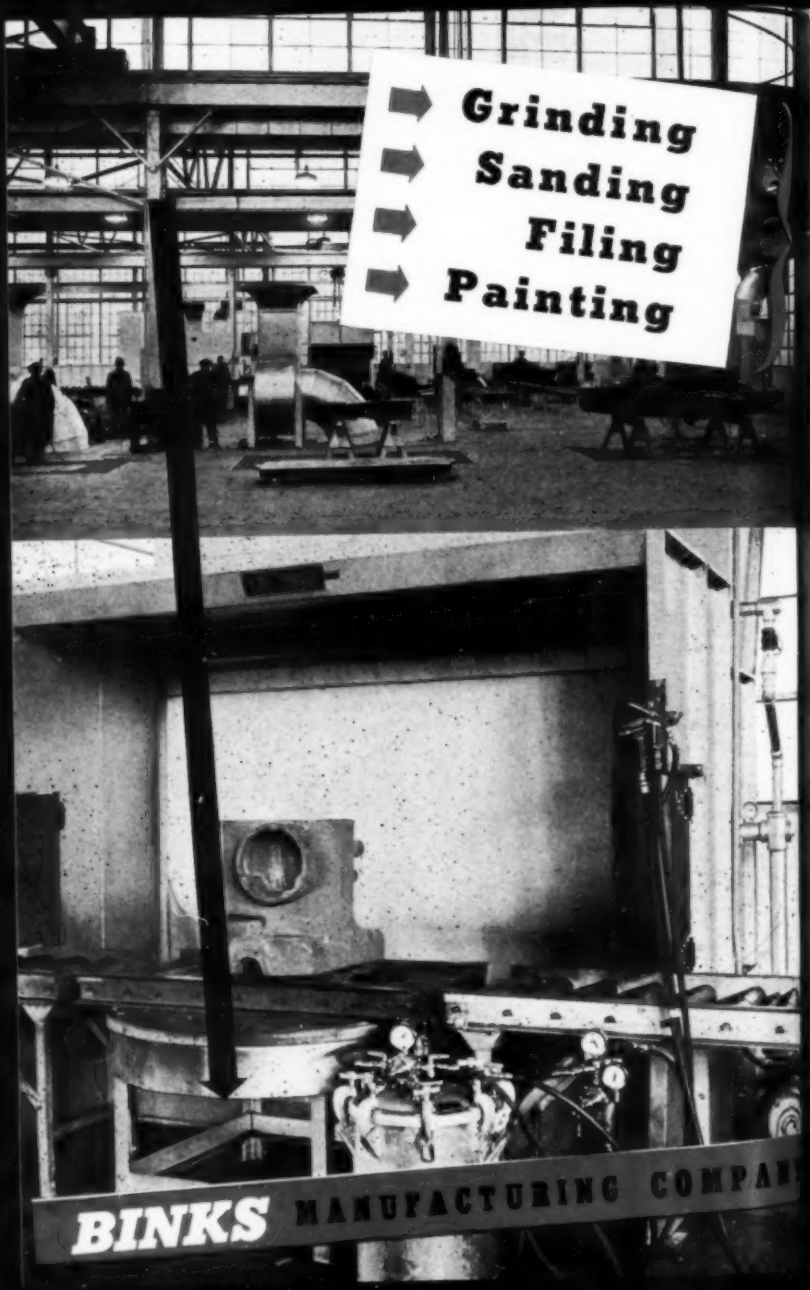
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vent rain from beating in, but should permit air to circulate freely.

Testing Wash-Coats; Note Their Sanding Characteristics

Since shellac is no longer available, much attention has been paid to substitutes. To date, I have seen none that compares with shellac. One of the prime requirements of a wash-coater is that it be insoluble in naphthas. To test for this, soak a pad of Kempack or Kotex in naphtha and lay it on a dry film of the wash-coater which has been flowed out on glass. After the naphtha has evaporated, carefully lift the pad and notice any tendency to stick. If the pad does stick to the film, so will filler; and considerable trouble will be encountered in the plant with muddy spots of unremoved filler. Any tendency of the film to blush under the pad will probably result in a dull, hazy color in the finish.

Notice very carefully the sanding characteristics of a sample panel. This will enable the finisher to warn sanding crews of hard sanding or any tendency of the wash-coater to sand through, should it be necessary to use the material in the plant. After a few tests have been run, the experienced finisher will be able to make many predictions about sanding from the type of film left on the glass panel. One that is soft and powdery will sand through quickly, while one that is soft and tough will drag badly and lead to poor sanding in the plant.

It is difficult to make many predictions about the filling properties of a wash-coat, from its performance on a small panel. Sometimes faults will show up which will save the trouble of a plant test.

Testing Fillers for Your Various Requirements

Drying time,* adhesion and hardness of a filler can most readily be determined by coating a glass slide with the material. It is a good idea to inspect the glass panel after the filler has dried four hours less than it normally will in the plant. This will assure good performance on poor drying days. Test for hardness and adhesion by rubbing the film with the finger. The effect of lacquer sealer can also be determined by spraying a moderately heavy coat on this panel. Any signs of lifting will foreshadow trouble in the plant.

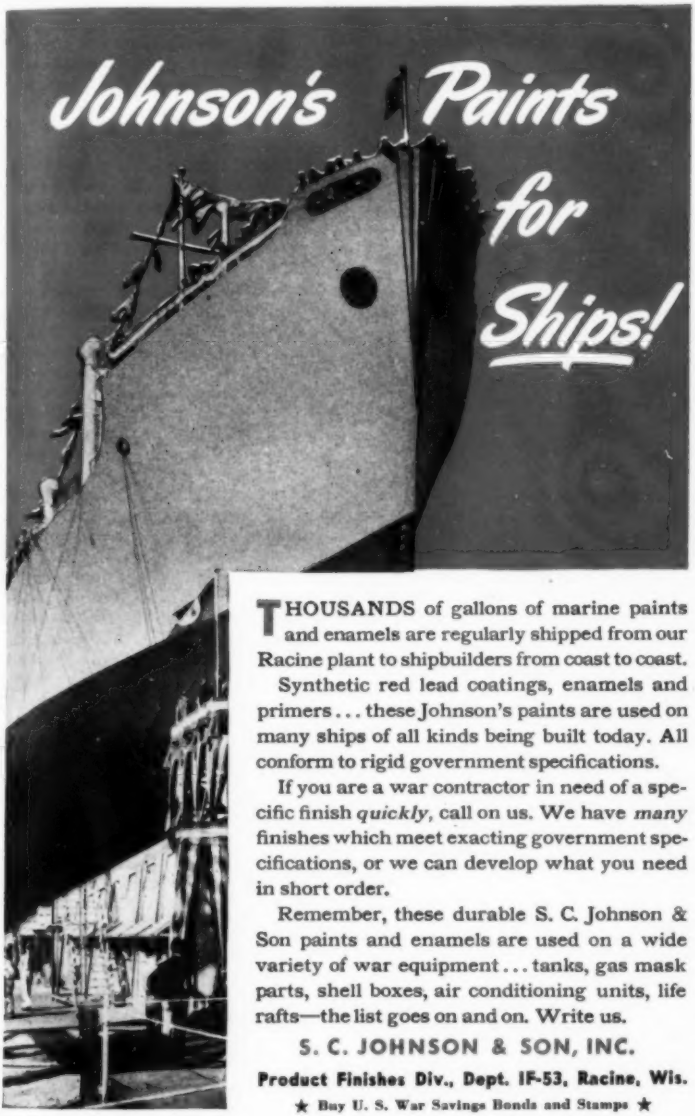
Occasionally a lacquer sealer will blush when applied over the filler. This is due to unevaporated petroleum solvents in the filler. If the filler is to be used, a sealer with stronger solvents must be used. The best test for texture of a filler is still that of rubbing samples on glass and wood with the finger tip. A rough, coarse filler will wipe out of the wood pores too easily, resulting in pinholes and other defects in the final finish.

As a final test, before releasing the filler to the plant, finish out a panel according to the usual schedule. Look for pinholes and unfilled grain in the finished panel.

What to Find Out About Varnishes

Leveling,* one of the most important tests which can be run on a varnish, is adapted from Federal specifications TT-V-86. Flow a coating of varnish onto an 8x12-in. glass panel and set on a long edge in a nearly vertical position to drain. After it has drained for eight minutes, draw a section of a comb through the film one inch from the top and bottom edge. This comb section should be about 1¼-in. long and contain ten teeth. After the panel has dried, note the number of lines that are distinctly visible. If more than three of the upper lines

*These tests may well be run on every batch of material received.



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are visible, trouble will be experienced in the plant due to orange peel and other characteristics of poor flow.

This test may also be used to determine the behavior of dust in the film. After the film has dried 20 minutes, lay the panel flat and permit dust, formed by rubbing a wad of absorbent cotton between the hands, to fall on the surface. Replace the panel in a vertical position to dry. It is easier to observe whether dust will pull out of the finish when it is rubbed on the glass plate.

Drying times* may be conveniently observed by testing with the finger along the center of the glass panel. The film along this point will be as uniform as can be obtained without special equipment.

Testing a Complete Finishing System

Sealers, lacquers and varnishes are best tested as complete systems. Select a panel about 3-ft. long and 18-in. wide, with a fairly uniform grain. All coats are applied as evenly as possible from end to end of the panel, according to regular production schedules. The one material to be tested is applied to one-half of the panel and a standard material is applied to the other. Run two series of the following tests on the finish, one two days after and the second two weeks after the panel is finished.

COLD WATER*: Fill a drinking glass with water. Place the panel, finished side down, over the top and invert the glass. After 24 hours, remove the glass, dry the panel and allow it to stand one hour. There should be no marks.

HOT DISH TEST*: Set a pint can on each finish to be tested and fill them with water at 140° F. After the water has come to room temperature, remove the cans carefully and note any sticking or marring. This test shows up better if a piece of cotton fabric is placed under the cans before filling them with water. Any finishing material that will not stand this test will cause a dissatisfied customer.

ALCOHOL RESISTANCE*: Bedroom furniture finish should show excellent resistance to 70% alcohol (rubbing alcohol), while dining room and living room furniture need not resist more than 50% alcohol. To test for alcohol resistance, pour enough alcohol of the desired strength on the finish to cover an area about 3x3 in. Permit this to evaporate and notice if there is any softening, blushing, or other marring, and to what extent the finish recovers. It is surprising how resistant some of the less expensive finishes are to this treatment.

BRITTLENESS*: The simplest and most uniform method of testing for brittleness is to drop a 6-oz. steel ball a distance of 3-ft. onto the panel. A finish that shows more than very few slight cracks under this test will be too brittle. Considerable marring will take place in packing and on the floor. A finish that is too soft will be marked by the ball instead of maintaining its bright surface.

A second test, which is readily run, shows not only brittleness but also shows adhesion of the finish. Cut a series of lines ⅛-in. apart, and a second series crossing at right angles to these. Then cut in the diagonal lines through the squares thus formed. There should be practically no chipping off of the finish. If the cuts are clean and the finish does not curl up at the edges, however, the finish may be too soft to rub well.

COLD CHECK TEST: This test is well known throughout the furni-

*These tests may well be run on every batch of material received.

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ture trade. Many cycles are used, but the most general seems to be one hour at 120° F. and one hour at -6° F. A good finish will withstand at least six of these cycles.

The high temperature may easily be attained in a standard lumber testing oven. The best equipment for the cold cabinet is an ice cream storage cabinet. The freezing section of an electric refrigerator will be satisfactory, particularly since this test is used as a direct comparison of a new material against a standard.

If a straight-grained veneered panel was selected for the previous tests, sections of it may be cut out for the cold-check test. Make the change from heat to cold and vice-versa as quickly as possible, to place the greatest strain possible on the finish.

In conclusion, let us remember a few key points: Be careful in all of your testing. Use exact weights and volumes. The day, when the snuff box and teaspoon were accepted as standards of measure, is gone. The best test is a direct comparison against a standard material on the same panel.

Don't trust to your memory. Write down the results of a test as soon as it is run.

Frolics in the Finishing Room—No. 16

A NUMBER of years ago we employed a fellow who developed a habit of getting a few hours of sleep during the night shift. This practice of his did not "set well" with the others, as it interfered with the smooth flow of work. It made them somewhat envious of his "getting away with sleeping on the job."

One night while Mr. Sleep More was in a comfortable reclining posi-

tion, recuperating his energies, one of the other men placed some lampblack inside a section of 1-in. pipe and, standing back several feet, gently blew into the pipe, depositing over the face of our sleeping friend a complete mantle of lampblack.

After awakening and getting back on the job he was mystified at the surprised glances, smiles and several guffaws given him, but did not appreciate his black-face make-up for several hours. Even after discovering his "white-washing in reverse," he did not realize how he came to have it.

The same procedure was repeated several nights later, except that this time the crew ignored his black-face appearance. Again it was several hours before he realized what had happened to him. Shortly after that his third baptism took place in a similar manner. By this time he had traced down the possibilities of where he had gotten the Al Jolson make-up and, taking a very broad and black hint, gave up sleeping on the job.—W. B. GERTZ.

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Mr. W. H. Rohr, Editor
INDUSTRIAL FINISHING MAGAZINE
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Dear Mr. Rohr:

For some time I have been planning to prepare an article on the undercoats used in the finishing of wood furniture. I have not referred to the little published literature on the subject because much of it is out of date, and the remainder is so general as to be of little value.

I have rather preferred to draw from my own experience in trouble-shooting for customers. This experience deals with the finisher's own everyday problems in using undercoats.

Also, many of the ideas developed in the article are entirely original, to the best of my knowledge. I have endeavored to show the finisher how he may avoid some of the most common pitfalls in using undercoats.

I believe there is a real need for an article of this sort, and welcome the opportunity to find expression in your most valuable magazine.

As I began putting down my ideas on paper it soon became evident that the article would be too long for one issue, and so I made it a two-part article, designed for publication in two monthly issues. Even then I had to do much condensing to keep it within reasonable bounds.

I sincerely hope the article meets with your approval. I shall welcome any suggestions you may have to offer.

Very truly yours

Rollin H. Wampler

Rollin H. Wampler

Undercoats in Finish Systems for Furniture

BY ROLLIN H. WAMPLER

PART ONE

Functions of Undercoats; Lacquer Sealers

IN FINISHING wood furniture, no operation is more important to the beauty or the durability of the finish than the proper application of a suitable sealing or priming coat. This is true with all types of finish systems, whether clear, translucent, or opaque.

The finish usually desired should be full-bodied, smooth, and so tough that light blows with a hammer will dent the wood without damaging the finish. However, the finish often obtained may be smooth and full-bodied, but it flakes off at the merest scratch. Or it may be rough and uneven, and yet adhere to the wood perfectly. Worse, it may be rough and uneven, and flake off at the slightest blow.

There are many factors that can produce these undesirable conditions of roughness, unevenness and lack of adhesion. Many times the top-coat or the filling operation is blamed when the fault actually lies in the sealer coat. It is really surprising in how many instances the blame for a poor finish can be traced to the sealer coat.

The undercoat has three functions. The first is to produce a continuous dense film that stops the suction of the pores in the wood, or of the filler if the wood is open-grained and requires filling. This film "supports" succeeding coats and prevents their absorption into the wood or filler while they are wet. Also, the sealer coat prevents shrinkage due to absorption of permanently liquid constituents from the dry film.

For example, shrinkage of lacquers is sometimes due to absorption of the liquid plasticizers many months after the film is considered to be dry. A suitable sealing coat can prevent this. All drying oils used in varnishes contain such liquid constituents, so that the same conditions can occur with varnish or synthetic finishes.

Other Functions of Sealer Coat

The second function of a sealer coat is to form a film that can be sanded to a smooth surface that has "tooth," so that top-coats can adhere well. Every finisher knows the importance of the sanding operation to the smoothness of the final system.

The third function of an undercoat is the most important and the least understood. It must form a bond between the wood and top-coats. If this function is disregarded or subordinated to other considerations, the finish may lack adhesion and flake off at the merest

scratch. It should be pointed out, in passing, that poor adhesion is not usually due to poor quality in the top-coats. Many times it is due to poor quality or faulty application of the sealer coat.

You can easily demonstrate this by a simple experiment. Take a large panel that has been stained and filled, and which is thoroughly dry. On one-half spray a thin coat of a short, cheap gloss varnish, or a gloss oil thinned to spraying consistency. On the other half spray a thin coat of a high quality floor varnish. When thoroughly dry, sandpaper the surface lightly and wipe it clean with a tack rag or a cloth very slightly moistened with water. Now apply a full coat of a high grade rubbing or floor varnish. Allow to dry well, and rub smooth.

Now dig your fingernail into the finish, or scratch it with a knife. Note how readily the finish scratches off the short gloss varnish, and how well it sticks to the other half of the panel. Bear in mind that the same varnish forms the top-coat on both halves.

Effect of Top Coat Solvents on Sealer Coat

Not only must the undercoat be properly chosen, but consideration must be given to the effect of the solvents in the final coats. A slight softening of the undercoat by the solvents in the top-coats is desirable so that they may "knit together." Too much softening, however, will produce undue swelling which causes ridges or orange-peel in the final coats. For this reason the undercoat should be thoroughly dry before the top-coats are applied.

On the other hand, if the top-coat solvents are weak, or if the undercoat is of such a nature that it is insoluble in the top-coat solvents, this can be compensated for by thorough sanding to produce a "tooth." The sandpaper really scratches out little grooves in the undercoat into which the top-coat can penetrate and form an anchor, if it has good wetting qualities. This mechanism produces good adhesion.

You can demonstrate this by securing an old piece of furniture, or a panel finished with varnish that has dried for many years. Sandpaper one-half of one surface well and leave the other half unsanded. Apply a coat of rubbing varnish. When dry, note the superior adhesion and toughness over the sanded surface. The undercoat was simply too hard for the top-coat solvents to afford the slight softening necessary for good adhesion. It was compensated for by sanding.

Thus it will be seen that sanding tends to promote good adhesion, in addition to its recognized function of providing a smooth surface.

If you will bear in mind the necessity for slight softening or "bite" of the undercoat by the top-coat solvents, it may save you lots of trouble. Most finishing schedules are set up to provide this "bite," so that you needn't be too concerned about it unless you are trying to track down such faults as crawling, poor adhesion, or roughness in the final finish.

Too little softening is almost never present in rapid conveyor finishing schedules. With conveyorized schedules, in fact, sometimes there is too much softening. This shows up as orange peel and lack of smoothness in the completed finish. Don't blame poor flow on the top-coat, or drying conditions, before investigating the softening effect of the top-coat on the undercoat.

Lack of Tough Finish Due to Undercoat Trouble

In passing, let it be said here that lack of toughness is almost always due to undercoat trouble.

(to page 55)

ATTENTION—
Manufacturers of Plywood Products!

AIRPLANES

LIFE BOATS

TRUCK BODIES

GLIDERS

FURNITURE

YOU, TOO, CAN HAVE DEPENDABLE YEAR 'ROUND PRODUCTION IN YOUR FINISHING DEPARTMENT

Stop waiting for the weather to get "right"! Don't tolerate hold-ups in the finishing department caused by excess humidity and changing temperatures that prevent the proper drying of "temperamental" plywood finishes. Get a steady, reliable production of finished *and dried* plywood products . . . twelve months out of the year . . . no matter what the weather!

HERE'S HOW A KOCH FORCE-DRYING SYSTEM WILL DO THAT AND MORE!

By subjecting the finished product to a controlled high-temperature and the correct relative humidity . . . a KOCH force drier reduces drying time from many hours to a comparatively few minutes. This coordinates your finishing operation with the production schedule . . . eliminates the necessity of a huge drying room . . and saves extra handling of finished pieces.

KOCH has designed and installed force drying and finishing systems for some of our largest manufacturers of wood products, such as furniture and wood products for civilian use and some of Uncle Sam's finest plywood military planes.

No matter how large or how small your requirements . . . KOCH'S experienced engineering staff is always ready to work with you.

For Complete Information—

PHONE, WIRE OR WRITE TODAY!

GEORGE KOCH SONS, INC.

MAKERS OF *Industrial Equipment*

2118 Pennsylvania St. EVANSVILLE, IND.

The case of the frigid finis

WRITE OR WIRE THE DU PONT WAR SERVICE MEN MAIL

☐ *How to speed output and save materials*

Handy pocket-size, fully illustrated booklet, *"Hints on Wartime Finishing Economies."* Shows you 11 points to check for greater efficiency and speed on your war contract finishing schedules.

☐ *How to meet emerg and solve problems*

Check here for the help of Du War Service Men—skilled "tr shooters" to straighten out "k in your finishing system *bef after* the trouble occurs. "know-how" is at your dispo any war contract finishing. about your trouble. Or w case of emergency.

. . . OR HOW A DU PONT WAR SERVICE MAN HELPED "PASS THE AMMUNITION"

To apply a finish exactly as specified is sometimes a difficult thing to do in *your* plant . . . on *your* product.

Take the case of the shell manufacturer who was hand-spraying his product with a specification paint. In order to secure a satisfactory viscosity, he considered it necessary to mix thinner and paint at a 3 to 2 ratio. However, when the paint was thinned to this extent, the operator had to make *two* passes with his spray gun in order to get satisfactory coverage. As a result, the Finishing Department was slowing down production.

But a Du Pont War Service Man fixed this bottleneck in short order. After a brief investigation, he discovered that the paint temperature was too low . . . only 52 degrees. He suggested that it be raised to 70 degrees.

What were the results? Briefly this: At this warmer temperature, paint and thinner are mixed at a 1 to 1 ratio. Now, each gallon of mix finishes 10% more shells. The amount of thinner required, and consequently the cost, has been reduced. And most important, the operator finishes each shell with a *single* pass of his gun. His production has been boosted 10%!

Du Pont War Service Men are out in the field ready to solve finishing problems like this one. There's a War Service Man in your area, and his long experience and thorough knowledge of finishes and finishing techniques are yours for the asking. E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

Better Things for Better Living
. . . *Through Chemistry*

MAIL THIS COUPON! E. I. DU PONT DE NEMOURS & CO. (INC.)
FINISHES DIVISION, WILMINGTON, DELAWARE

SEND THIS ENTIRE COUPON TO:
E. I. du Pont de Nemours & Co. (Inc.)
7150-E, Du Pont Building
Wilmington, Delaware

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(This coupon good only in the U. S. A.)

ENAMELS
UNDERCOATS

LACQUERS

SEALERS

STAINS • GLAZES

SHELLAC

NOVELTY FINISHES

•

IN STEP WITH THE TIMES

Industrial Finishes

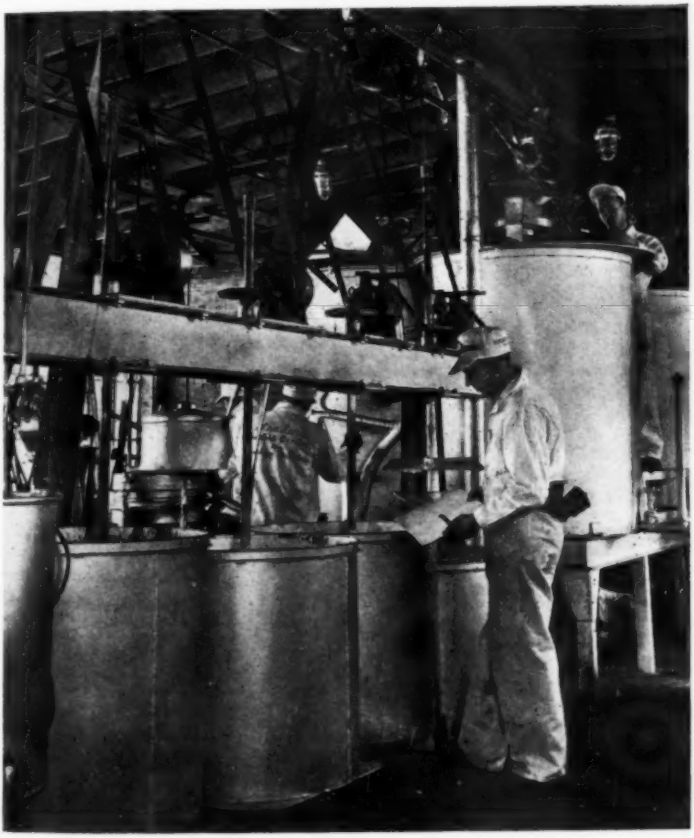
that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• **FOR APPLICATION BY ALL METHODS**

JAMES B. DAY & CO., CHICAGO

Bear in mind, too, that toughness and adhesion are intimately related.

Most top-coats are formulated with the maximum of toughness consistent with speed of drying and satisfactory rubbing qualities. If the top-coat is clear lacquer, application of a coat of the same lacquer (reduced equal parts with lacquer reducer) in place of the usual sealer coat will often give greater toughness and adhesion. However, such an undercoat cannot be sanded smooth satisfactorily under the usual conditions. The same thing is true of varnish. Just as an experiment, try a thin coat of rubbing varnish as an undercoat for a top-coat of the same varnish. Note the unusual toughness you obtain, although sealing qualities and



smoothness may not be very good.

The facts noted above are particularly true of urea-type furniture finishes. Such materials have none too much inherent adhesion. No really perfect undercoat for these materials has been found except for a thin coat of the same material directly over filler. Try it out. You will be amazed at the great toughness and adhesion you get.

Lacquer Sealers Are Excellent Undercoats.

Now let us consider lacquer sealers—the most widely used clear undercoats. They are ideal undercoats in many ways for all types of finishes on wood furniture.

Lacquer sealers dry fast, seal well, and are ideal for the conveyor line. They also sand well—too well in many cases, as we shall see. These products are made with a modified cellulose, usually nitrocellulose because of its speed of drying, hardness, toughness, ease of solution, and compatibility with resins. Resins are always used, usually ester gum modified maleic glyceride resins. These resins release their solvents rapidly and give body and adhesion to the film. Plasticizers, such as oils, esters of certain organic acids, or alkyd resins, are added to give elasticity, toughness and adhesion. Last, sanding agents are incorporated to give ease of sanding.

Right here is where more adhesion troubles originate than anywhere else. First, however, let us consider the nature of sanding agents. They are soaps, in a chemical and literal sense. They are not water-soluble, as are ordinary toilet soaps used for cleansing purposes. However, they partake of many of the other characteristics of ordinary soap. They are soft and slippery; and nothing will stick to them. That is why they promote easy sanding and prevent sandpaper from "corning" or "picking up." These soaps or sanding agents are zinc, aluminum, magnesium, and calcium stearates; and palmitate and laurate soaps of the same metals.

What Ruins Adhesion

Too much of these soaps in the sealer film always ruins adhesion. You can demonstrate this to your complete satisfaction as follows: Prepare a panel as you would a piece of furniture. Stain and fill it in the ordinary manner. Now get about a quart of a good lacquer sealer at the proper spraying consistency. Put it in a covered container, preferably glass, and allow it to stand several days.

You will observe that the sanding agent settles down to a fluffy layer at the bottom. Now carefully dip or pour off as much of the clear lay-

Wartime Finishes Protect Small Parts that Make Big Weapons Mighty

Paint plays an important part in protecting the tiny parts of incredibly accurate precision instruments and controls which give eyes and slugging power to America's mighty weapons of war.

Lowe Brothers, for instance, supplies the material which is used to finish bombsight parts. This material minimizes expansion and contraction of the metal part. And Lowe Brothers cooperates to periodically check the Company's finishing system, thus assuring continuous and accurate application of a paint film of non-varying thickness.

Whether it is a finish which contributes to the dimensional control of a tiny part, or a protective finish for war weapons, equipment or materiel, you can depend on Lowe Brothers broad experience with Government Specifications and other industrial formulations to be helpful in solving your current problems. For information on costs, bids, or drying schedules consult

INDUSTRIAL SALES
THE LOWE BROTHERS CO.
DAYTON, OHIO

Lowe Brothers
WARTIME FINISHES *for Industry*
IN ACCORDANCE WITH U.S. GOVERNMENT SPECIFICATIONS

er as you can. Spray half the panel with this clear layer. Stir up the remaining sealer containing all the pigment and apply it to the other half of the panel. Sand well and apply a coat or two of lacquer or varnish. Allow it to dry thoroughly, and then rub the surface smooth.

Now test the toughness and adhesion of the finish with your fingernail or knife. You won't believe how much tougher the finish is over the unpigmented sealer until you actually try it. Also, note the better gloss over this portion of the panel, particularly if the top-coat is lacquer. This difference in gloss is most readily seen if you carefully examine the panel before rubbing.

Have you ever found this distressing lack of adhesion in your finish? Here are some cases drawn from my experience:

Examples of Variations in Adhesion of Finish

A furniture finishing foreman complained that some of his cases showed poor adhesion, while others finished the same way were all right. He blamed it on the finishing materials, saying they were not uniform. Investigation disclosed that he sprayed his sealer by gravity from 5-gallon containers. These containers were filled, raised to the ceiling by rope and pulley, and left there until empty. Further investigation disclosed that the sealer he sprayed early in the morning, from containers filled the previous evening, was dead flat in sheen (a sign of excessive sanding agent), sanded well, but gave poor adhesion. Sealer from the same container, as the morning wore on, was glossy, sanded poorly, but gave excellent adhesion.

The explanation was simple. The sanding agent had settled overnight to the bottom of the container around the exit opening. Next morning it was not stirred up, and all the sanding agent came out in the first two or three quarts of sealer. That is why the sealer then became glossy and sanded poorly. The solution of his problem was equally simple: Make sure the sealer is well stirred before beginning each day's operation.

Other Examples—All Due to Lack of Stirring

In another case the same troubles of poor adhesion were observed. In this case the same type of overhead containers were used, but the sealer in them was well stirred every morning. Investigation disclosed that the workmen filled their containers from a drum of sealer laid on its side in a rack, with a valve screwed into one of the openings. This drum might be sufficient for several days' operations. Sealer in the drum was never stirred, from the time the drum was put on the stand.

The problem was solved by providing a stick for stirring the contents of the drum through the bung in the side, and requiring each workman to stir it well before drawing any off into his container. Settling of the sanding agent in the drum had caused all of the trouble.

In still another case, on a similar complaint, the circulating type of force-feed pump was used to force sealer from the drum to the spray guns. Here it was discovered that settling of the sanding agent in the drum overnight was the cause of the trouble. The solution of this problem was to tip the drum on its edge and shake it a few times before beginning operations. A simpler method was to allow the pump to operate several minutes in the morning to thoroughly mix the sealer before beginning to spray.

These are actual case histories which you may have experienced yourself. *(to page 60)*

Your Product May Have Lines As Smart As This Professional Model ...But What about *Finish?*

When your designers create smart lines for your product . . important as that is . . the problem of eye appeal is only partially solved. Finish must also do its part.

Many a smartly designed product is handicapped in competition because of an inappropriate or unattractive finish . . a problem that could be solved very quickly in our Creative Studio. Use this service . . it is given without charge to reputable manufacturers.

War Products

For workability, speed and freedom from rejects use Rockford finishing materials. They meet all U. S. Government specifications and requirements.

No Tampering with Quality

ROCKFORD VARNISH *Company*

ROCKFORD, ILLINOIS

Manufacturers of Protective and Decorative Coatings

The sanding agents in lacquer sealers, at spraying consistency, will always settle out overnight or over a week-end. It has not been possible, so far, to make a truly non-settling sealer at spraying consistency. Finishers will have to bear this in mind and act accordingly. Settling in thick sealers that require reduction for spraying is not so pronounced.

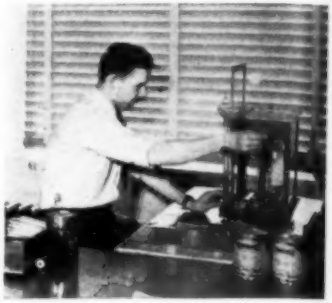
The judicious use of the proper amount of the right kind of sanding agent in a lacquer sealer will not hurt adhesion; but a slight excess will often ruin it. Provided the sealer is properly formulated, you can avoid the greatest single source of adhesion troubles by keeping the sanding agent in uniform suspension all the time it is being used.

Lack of Drying Time on Conveyor Schedule to Blame

But finishers are not always to blame for adhesion troubles due to excessive amounts of sanding agents. Conveyor designers and builders are often responsible. In designing and selling their installations they allow too little time for the sealer coat to dry. Twenty or 30 minutes' air drying is not enough. You have to use too much sanding agent in order to get satisfactory sanding of the sealer in the time allowed.

One remedy is to provide a small drying tunnel, with a blast of heated air to drive out the solvents from the sealer. This hot-box should be so arranged that the furniture enters it just after the sealer coat is firm to the touch; not before. In this way satisfactory sanding with not too much sanding agent in the sealer can be obtained 30 minutes after application.

Another cause of trouble, for which management is responsible, is speeding up the conveyor far beyond the speed for which it was designed. Most conveyors are designed to operate from eight to 12 or 14-ft. per minute. To speed up a conveyor to 16 or 20-ft. per minute so decreases the drying time that satisfactory sanding is not obtained. The management then calls for a faster sealer. More stearate, quicker sanding, poor adhesion — these are the results.



A sign of excessive sanding agent is quick sanding with excessive powdering. This powder consists largely of sanding agent. Even when it is well dusted off, poor spreading and adhesion result.

Carefully Clean Dust From Sanded Sealer Coat Film

This brings us to another phase of the evils of excessive sanding agents. Take a large panel that has been stained and filled, and apply a coat of a good quality lacquer sealer. Sand well. Now carefully wipe off the sanding dust from half the panel and merely blow off the remainder (the usual practice).

Spray on a very thin coat of lacquer or varnish. Note how the material spreads easily to a wet, continuous film over the well-cleaned sealer, but leaves a surface full of pinholes on the unwiped half. This pitting or pinholing is caused by the sanding agents left on the surface. Certain sanding agents are particu-

Lionoil

Protects Cutting Tables

Wherever leather, cloth, tobacco, meat or other materials are cut on wood tables or blocks, Berry Brothers Lionoil protects the wood. A well known shoe manufacturer tells us that the tops of cutting tables, treated with Lionoil, go three weeks without re-dressing, whereas they were formerly re-dressed every week. LIONOIL PENETRATES, OXIDIZES AND "CASE HARDENS" THE WOOD. Lionoil also provides an ideal finish for wood factory benches and tables — retards splintering — makes them easier to wash and keep clean — seals surface against oil and dirt stains. Would you like further information? We will be glad to answer any questions promptly on request.

Quality Finishes Since 1858

BERRY BROTHERS

Industrial Varnishes • Enamels • Lacquers

DETROIT, MICHIGAN • WALKERVILLE, ONTARIO

JERSEY CITY • BOSTON • CINCINNATI • CHICAGO • ST. LOUIS

larly bad for this. Urea-type furniture finishes are especially sensitive to this condition. Many times even a very wet, full coat will not suffice to thoroughly wet the surface.

The careful removal of all sanding dust will prevent many troubles.

This discussion of the evils of sanding agents is given in such detail because they are not widely enough recognized and cause so much trouble, particularly in regard to adhesion.

The proper use of a properly formulated lacquer sealer or sanding sealer is good practice. But always remember to keep it well stirred, clean off sanding dust well, and don't demand too much ease of sanding. Be willing to sacrifice a little speed with the results of a little tougher sanding in order to gain much greater toughness and adhesion.

(Concluded Next Month)

E. H. Bucy Returns to Zapon

Mr. E. H. Bucy, recently with the War Production Board, has been appointed assistant general manager of the Cellulose Products Department, including Zapon and Zapon-Keratol Divisions at Stamford, Conn.

Mr. Bucy became technical director of Zapon-Brevolite Division of Atlas Powder Co. at Chicago in 1933. In 1934 he came to Zapon Division at Stamford, also as technical director. In January, 1942 he was selected a consultant to the WPB in Washington, and in August of 1942 became Chief of the Protective Coatings Section. He remained in this capacity until April 1, 1943 and has now assumed his new duties at Stamford.

Mr. Bucy in his career with Zapon has pioneered in many new phases of finishing chemistry and application. He has read a number of papers before groups and societies in the finishing field.

E. H. Bucy, recently with WPB, assumes responsible position with the Zapon Div. of Atlas Powder Co. at Stamford, Conn.

Muse Becomes Sales Manager of Industrial Abrasives, Inc.

W. B. "Bill" Muse has been appointed Sales Manager of Industrial Abrasives, Inc., 3724 W. 35th St., Chicago, Ill., manufacturer of coated abrasive discs, according to an announcement by L. H. Metzger, president.

For several years Mr. Muse was sales manager of a Chicago concern that manufactures and sells portable sanding machines.

"The appointment of Mr. Muse heralds the opening of a national program of new sales activities by Industrial Abrasives," said Mr. Metzger. "We will soon announce several additional items which will be of utmost interest to those seeking new and more efficient abrasive methods to increase their efforts in the production of war goods. Tests have been completed and results have proven most amazing."

Industrial Abrasives manufactures the Dia-Mo-Nex Non-Clogger coated abrasive disc with several patented, exclusive features, of which the 2000° F. heat resistant bond has been outstanding.

Ferbert-Schorndorfer Honors Veteran Employes

The Ferbert-Schorndorfer Co., 12815 Elmwood Ave., Cleveland, Ohio, held a banquet recently at the Cleveland Club honoring nine employes who have been with the company for 20 years. These men were presented with diamond pins signifying their length of service. Thirty-four men and one woman employe were presented with ruby pins for ten years or more of service.

Dave Andrew, president, made the presentation of the pins to the employes. Carl J. Weber, secretary of the company, received the first pin in recognition for his being the oldest employe.

The Ferbert-Schorndorfer Co. was founded in Sept., 1921, when it took possession of its present plant on Elmwood Ave. This Company manufactures paints and varnishes for general industrial use. At the present it is devoting its efforts 100% to war work.

WHAT'S YOUR PROBLEM?

We've got the Answer!

If wartime specifications have created new and perplexing finishing problems in your plant, there's a fast and sure way to lick them. Call a Glidden engineer—a specialist in industrial finishing. He has what it takes to find a complete solution of your problem.

Ability to Meet Any Specification

Our large technical staff and extensive research facilities have an enviable record for solving industrial finishing problems. And we have the "know-how" and modern manufacturing equipment necessary to produce the answer to *your* particular finishing problem.

A Complete Organization near You

Quality finishes are available to you from eight strategically located plants. Each is complete with technical engineers, research laboratory and modern production equipment. So, wherever your plant may be, there's a Glidden engineer nearby to serve you.

Wartime Finishing at Peacetime Cost

Although the attention of war industries is focused on full-out production, costs must not be overlooked. We have given special consideration to see that excessive costs are not one of your problems. A Glidden engineer is ready to work hand-in-hand with you to reduce finishing costs.

The Glidden Line of high quality industrial finishes now include Time-Tested products made from non-critical materials. Their performance on many finishing lines has helped maintain volume of output, increase finishing speeds, reduce costs and supply the right finish for the job. Ask a Glidden engineer to call and show you what they can do for you.

THE GLIDDEN COMPANY • National Headquarters, Cleveland, Ohio

Factories or Branches in Principal Cities

GLIDDEN

★ ★ *Everywhere on Everything* ★ ★

Materials Supplies Equipment

Non-Breakable Glass Tanks

The Pittsburgh Plate Glass Co., Pittsburgh, Penna., announces a line of glass tanks for industrial or commercial applications requiring a non-corrosive, shock-resisting material. They use a minimum of critical material and are not just glass lined, but are actually tanks made of glass, made by building up required shape and size of heavy tempered glass plates. The result is a rigid, permanent, sturdy tank, free from maintenance or wear.

Mills, factories, plants have heretofore experienced difficulty in holding acids or chemicals in tanks that would at the same time be free from attack. The new glass tanks eliminate practically all the former difficulties.

Tanks of glass have already proved their ability to "take it" and continue to give service in one of the most severe of all tank applications—pickling tanks for steel and other metals.

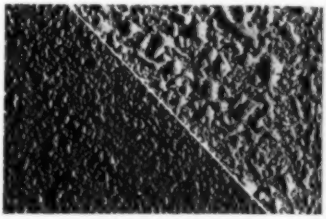
Pebble-Tex Finish

The Egyptian Lacquer Mfg. Co., Rockefeller Center, New York, N. Y., announces a new wartime rough metal finish called "Pebble-Tex."

This new finish has been well received by prominent manufacturers of parts for radio-equipment for military use, and for instrument panels, fire control and listening devices, and other service items requiring a high-speed textured metal finish.

For full protection, it is recommended that Pebble-Tex be applied over a primer, but the pattern may be obtained with a single application on bare metal.

The accompanying illustration shows parts of two panels finished in Egyptian Pebble-Tex. Both the rough and



Two samples of Pebble-Tex finish.

fine texture, and varying degrees in between, may be obtained from the same mix gun adjustment and application technique. This finishing material is available in a variety of colors and is also recommended for essential civilian articles requiring a rough finish.

Fire Extinguisher Case Prevents Tampering

To reveal instantly any attempt to tamper with fire extinguishers, American-LaFrance-Foamite Corp., Elmira, N. Y., has introduced a new inexpensive extinguisher case, known as the Tampless Case.

Constructed of non-critical, tough cardboard stock, it safely houses the extinguisher from the reach of unauthorized persons, and yet allows of instant removal for legitimate use. One quick pull on a sealed string breaks through a gummed paper sealing strip and permits the Tampless Case to unfold. The extinguisher can immediately be lifted from its bracket.

The Tampless Case can be reused. Simply reservice extinguisher, replace, fold case, and reseal.

A feature of the Tampless Case makes available for the first time im-

FAMOUS FINISHES

BEFORE this war ends, Private Jones will come in contact with a large number of Pittsburgh's *Famous Finishes.* He'll find them protecting tanks, jeeps, trucks and planes . . . perhaps on the transport that takes him to the front . . . on shells, bombs, grenades and land mines . . . yes, even on the wooden bed in which he sleeps in camp or on the wooden lockers he sees everywhere.

Special Pittsburgh finishes for wood surfaces not only meet all government requirements but give to the contractor definite production advantages in finishing the Army's wooden bedsteads and lockers. Designed for maximum adhesion and uniform sealing on all varieties of wood used for these purposes, Pittsburgh Olive Drab finishes are uniform in application by brush or spray. They are free-flowing and self-levelling and they dry to a uniform smooth high gloss. These Pittsburgh famous finishes for wood stand up under rigid conditions of wartime use.

Free Advisory Service. Pittsburgh's vast experience in all types of industrial finishes can save you time and money. A phone call, wire or letter will bring a Pittsburgh representative to your office for consultation.

PITTSBURGH PLATE GLASS COMPANY — Industrial Paint Division, Pittsburgh, Pa. Factories: Milwaukee, Wis.; Newark, N. J.; Houston, Tex.; Los Angeles, Calif.; Portland, Ore. — Ditzler Color Division, Detroit, Mich. — The Thresher Varnish Co., Dayton, O.

PITTSBURGH *Industrial* **FINISHES**

PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

portant fire-fighting instructions at the actual location of each extinguisher. Precise information on the front of each Tampless Case shows the classes of fire on which extinguishers should be used, and the kinds of fires on which they should not be used. Clear, concise instructions also show how each extinguisher should be operated.

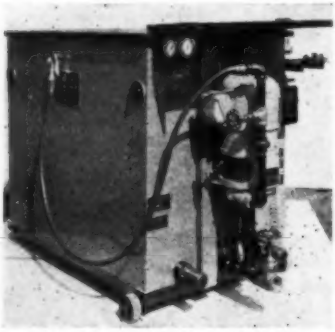
Portable Metal Parts Washer

The Washing Machine Division of the Magnus Chemical Co., Garwood, N. J., announces a new, portable multiple purpose washing machine for cleaning a wide range of large and small metal parts.

The machine is manufactured in three sizes. It is designed and built to meet the needs of metal fabricators whose production rates do not warrant the installation and use of large fully automatic washing equipment.

Parts to be cleaned may be handled by three methods: If real small they are handled in bulk (in basket); if large, they are handled individually on the lower platform; or they may be hung on racks in the solution.

Articles to be cleaned may be either soaked and agitated in baskets or on the lower platform; or sprayed with cleaning solution by means of a pump and spray gun; or both, that is, soaked in the lower section of the machine and rinsed at the upper level by means of a flush gun. The machine provides agitation of the parts by an up and down motion, thirty 3-in. movements per minute.



Portable, compact, versatile, efficient.

Several types of cleaning solution may be used. It is well adapted to the use of emulsifiable cleaner such as Magnus Emulso-Dip cleaner. It is equipped with immersed electric heating units, thermostatically controlled, for use with hot alkaline solutions. Or, it may be adapted to the use of chlorinated solvents.

Durable and Resistant Finish for Metal

Armor-Vit is an exceptional rust or corrosion resistant finish for metal products. It has proved its ability to repeatedly withstand the standard 200-hour salt spray test, extended weatherometer tests, and all manner of acid and alkali tests with excellent results. Impact and abrasion are capably endured by this new finish.

As for heat resistance or its ability to withstand thermal shock, Armor-Vit, applied to ordinary steel test plates, has been heated to 1200° F., then quenched in cold water, without failure of the coating. The new finish effectively withstands such acids as acetic, sulphuric, nitric and hydrochloric. It resists such chemicals as cold concentrated caustic soda, ethyl alcohol, toluene, ether, sodium chloride solution, calcium chloride solution, ammonium hydroxide and tri-sodium phosphate.

This new and totally different coating for metal products was developed by the laboratories of the Chicago Vitreous Enamel Product Co., Cicero, Ill. There is no relationship between this new development and porcelain enamel, and being inorganic, no comparison with paint, lacquer or synthetic finishes.

Armor-Vit is essentially an alkali alumina silicate, one source of which is a new ingredient, an oil-bearing halloysite. There are various types of halloysites, but this particular one is

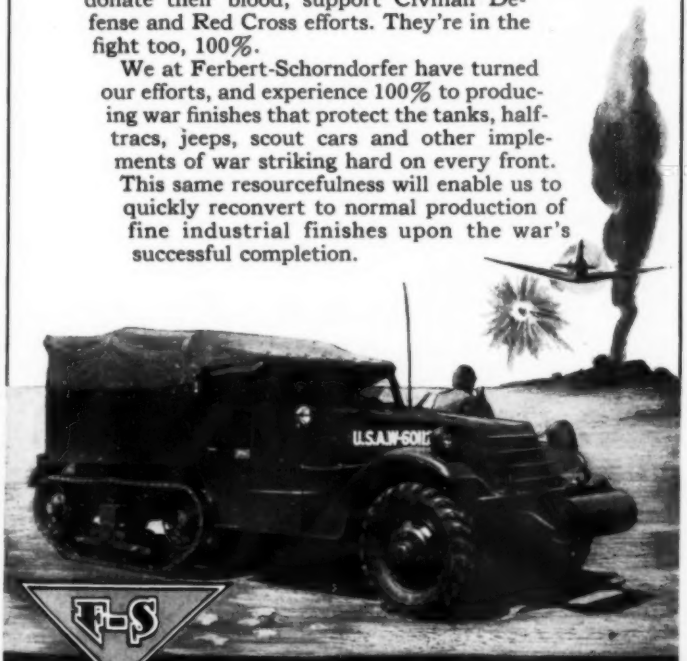
100% IN THE FIGHT

Americans over the world are in the fight 100%.

On the battlefields, in the frigid arctic or the blazing desert, Americans, men and machines are demonstrating their ability to take it and fight. They're in it 100%.

On the home front, Americans work long hard hours, regularly buy bonds and stamps, donate their blood, support Civilian Defense and Red Cross efforts. They're in the fight too, 100%.

We at Ferbert-Schorndorfer have turned our efforts, and experience 100% to producing war finishes that protect the tanks, half-tracs, jeeps, scout cars and other implements of war striking hard on every front. This same resourcefulness will enable us to quickly reconvert to normal production of fine industrial finishes upon the war's successful completion.



F-S

FERBERT-SCHORNDORFER CO.

12815 ELMWOOD AVENUE • CLEVELAND, OHIO

WEST PARK STATION

black and oil-impregnated, which characteristic lends immeasurable benefit to the finished material.

After the application of Armor-Vit, by spraying or dipping, the curing treatment (best accomplished in an indirect-fired, air-circulating oven with proper temperature control and capable of heating to 750° to 800° F.) combines the ingredients of the coating into a hard, heat-resisting finish, insoluble in boiling water and highly resistant to most acids and alkalies. Armor-Vit is applied in either one or two coats at .0005 to .0010-in. in thickness. In preparation for its application, the metal is cleaned by ordinary cleaning methods—alkali cleaner, acid pickling and neutralizing. Sand-blasting is usually recommended for cast iron.

Removable Ink for Steel Surfaces

Doall Steel ink has been developed by The Doall Co., Des Plaines, Ill., for use in precise layout work on dies, templates and machine parts, to locate high spots in scraped machine ways, to check gear tooth contact and to determine the relation of mating surfaces.

A feature of this product is its quick drying properties. Under average conditions it will dry hard enough to start layout one minute after application. It adheres perfectly to ground surfaces of steel. Its deep blue color provides excellent contrast with scribed lines. It will not shrivel, check or crack.

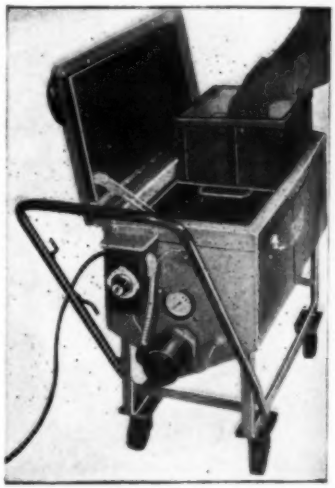
Doall steel ink is not easily abraded by the action of chips in machining operations and is not attacked by machine oil or the usual cutting and soluble oils, yet it can be removed readily, when machining operations are completed, with an alcohol-moistened cloth.

The satin-like luster of the ink resists light glare, thereby minimizing eyestrain for the operator. This is especially important when close work is being done. The ink is available in 4-oz. and 16-oz. bottles with convenient applicator tops.

Portable Heated Metal-Degreasing Tank

Fast, economical cleaning and degreasing of metal parts and products is possible with the "Dipmaster, Jr.," a portable, insulated electrically-heated dipping tank, according to the manufacturer, Aeroil Burner Co., Inc., West New York, New Jersey.

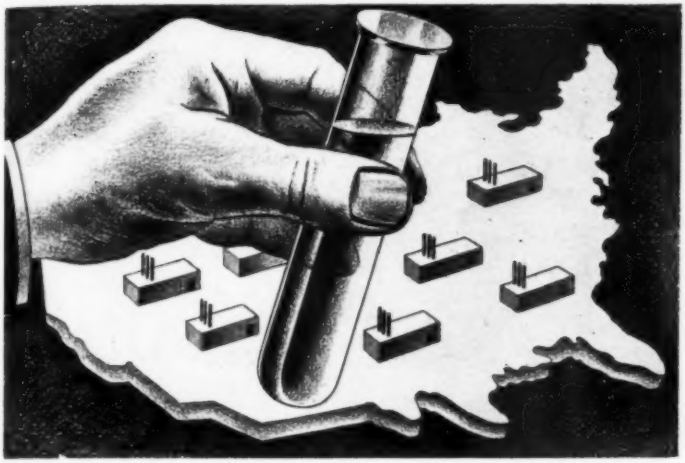
Holding 12 gallons of solution, which is its normal capacity or 15 gallons maximum, the Dipmaster, Jr., is



Electric-heated metal-cleaning tank.

equipped with a heating element located inside on the bottom of the tank where it is completely submerged. Thus, there is no gap to jump between the heating element and the liquid itself. Average heating time from a cold start to a boiling point (212° F.) is only 1¼ hours. This result is achieved by the above construction feature, it is claimed.

Four casters (2 swivel type, 2 rigid), provide for easy maneuverability. It is ready for instant operation by simply plugging it in on 110 or 220 volt A.C. or D.C., using the extension cord with which the tank is provided.



SCIENTIFIC RESEARCH

Your post-war finishing problems are being solved today in thousands of plants throughout America . . . producing the many thousands of products necessary to the winning of the war . . . with newly developed materials and methods mothered by military necessity. Some of these discoveries are available now. Others . . . now military secrets . . . will be available immediately the war is won. But for the manufacturer with foresight to plan tomorrow's product today . . . there CAN be no delay. When victory releases demand it will be too late for research. Waiting customers will demand production. NOW is the time to act . . . for today's planning will determine the success or failure of tomorrow's production. Your inquiry will incur no obligation. Address The Stanley Chemical Company, East Berlin, Connecticut.

Stanley Chemical

Standard equipment furnished with the Dipmaster, Jr., includes two dipping baskets, in which the parts are placed, each measuring 11¾-in. long x 11¾-in. wide x 8-in. deep; a bi-metal type thermometer registering a temperature range of 100° to 600° F. and a thermostatic control of the rigid, shock-proof type, equipped with a dial and knob to shut off the heating element manually and to maintain automatically any desired temperature between 100° and 550° F.; also draw-off cock for emptying the tank.

In order to reduce heat loss to a minimum and thus enable the operator to get a quicker start in the morning, the steel tank is insulated all around the inner shell. This feature also contributes in savings on power consumption. An insulated cover with handle has a bracket to keep it in open position when the tank is being loaded or unloaded.

Larger stationary models of the Dipmaster, Jr., are available, ranging up to 600 gallon capacity, and they are heated by kerosene, city or liquified gases, with removable immersion tube heating units in the tank.

Infra-Red Reflectance Standards Now Available

Today, many Government paint specifications call for infra-red reflectivity. To meet this increasing demand for infra-red reflectance standards, the Stewart Research Laboratory, 1340 New York Ave., N. W., Washington, D. C., has made available excellent standards for immediate delivery. These standards are permanent and washable. They are metal, coated with a durable baked enamel, and are sold in sets of three. These correspond to the three levels of infra-red reflectance used in U. S. Army Specification No. 100-12, which are as follows:

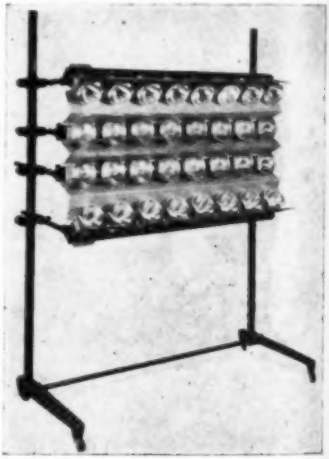
Panel No. 1	21.7%
Panel No. 2	37.4%
Panel No. 3	56.6%

The standards are calibrated for the Wratten 89-A filter, and are accurate to plus or minus 0.5%. They can be used for direct photographic comparison or for reflectometric measurements.

With every set of panels, there is included a pamphlet giving a full explanation of the standard procedures for measuring infra-red reflection. This pamphlet also discusses the advantages and disadvantages of each method, giving a comparison of the filters commonly used. Also included are procedures for proper use of Stewart Infra-Red Reflectance Standards.

Portable Infra-Red Drying Unit

The new line of sectional interlocking infra-red drying and baking units developed by Op-Al Electric &



Adjustable to different positions and can be set up singly or in multiple.

Mfg. Co., 1953 Martindale Ave., Indianapolis, Ind., is designed for quick assembly and is available in a number of various size units. The simplified construction and easy assembly make these units adaptable to practically all drying and baking processes.

There's more than one way to finish a Jap!

Adapting equipment to fit the need is a true test of ingenuity in an emergency. ☆ As a recent example, a specification finishing material called for the use of convection baking ovens. The manufacturer didn't have these facilities but he did have radiant heat ovens. We developed and suggested a finish which was satisfactory to both manufacturer and government authorities and enabled the use of present equipment. ☆ Send for booklet, "Information on U. S. Government Specification Finishes," containing an up-to-date list of specifications and the M & W finishes which meet them. If, for any reason, you need special finishes or the help of our engineers on any finishing room problem, your inquiry will have our prompt attention.

M & W

MAAS & WALDSTEIN COMPANY, NEWARK, N. J.

PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALTY FINISHES FOR ALL PURPOSES

BRANCH OFFICES & WAREHOUSES: 1658 CARROLL AVE., CHICAGO, ILL. • 1228 W. PICO BLVD., LOS ANGELES, CALIF.

The units are interlocking, adjustable to horizontal, vertical, square, round or irregular shape tunnels, and are suitable for fixed or conveyor installations.

Sections are furnished in 4-ft. and 8-ft. lengths, wired complete with switch control for each strip. The basic 4-ft. 32-lamp assembly has an output of approximately 8.9-watts per square inch for 24-in. tunnel shape adjustment, radiating on a 12-in. concentric surface. The flat bank surface of this same unit, 28x48-in., will radiate 5.9-watts per square inch. The same dimension unit is also furnished with 24 lamps and a radiation output of 6.6 and 4.5-watts per square inch, respectively.

The assembly can be expanded by merely adding pedestals and strips. Variations in shape can be made quickly by adjusting strip units through a universal cross slide block.

Measures the Toughness of Surface Coatings

Announcement of a new shear-hardness attachment for the Taber Abraser is made by the Taber Instrument Corp., North Tonawanda, N. Y.

This attachment provides an accurate method to measure the toughness quality of surface finishes and their ability to resist digs, scrapes and similar abuse from actual service not considered normal wear.

A weight slides along the calibrated beam until it is finally located in the position where the correct load permits the tool point to cut a groove in the surface finish without digging through to the nearest thousanth of an inch, made in the surface and the most representative one is selected to measure to the nearest thousandth of an inch. A special Taber micrometer is furnished to make the measurement.

The shear-hardness of the specimen is calculated by taking the reading from calibrated beam at the forward edge of the adjustable weight which, together with the width of groove, determines the result by a mathematical formula. Only a small 4-in. square sample is required to make this easy, quick test.

In addition, the Taber Abraser efficiently and accurately evaluates resistance of surface finishes to rubbing abrasion. Scientific wearing action by "Calibrase" wheels on specimen clamped to revolving turntable is measured in terms of "Wear cycles" which are automatically totalled on built-in counter.

Gives accurate information on finishes.

Quick Finish Repair System Gives Perfect Match

The Lubrisol Pad-O-Pague process, offered by Finishine Laboratories, Syracuse, N. Y., is a method of quickly repairing a damaged or marred finish on wood or metal surfaces. Any type of finish or color can be matched and repaired so perfectly as to defy detection afterward.

Complete detailed directions are given on how to prepare the surface to be repaired; how to select, mix or blend the colors to match; how to pad on the Lubrisol (available in two different gum concentrates) aided by moistening the pad with Lubrisolvent; where and how to use the clear transparent Pad-O-Paque; and how to dull rub the final built-up matched color if dulling is necessary or desirable.

Infra-Red VICTORY TUNNEL dries Paint on U.S. Tanks

360 Times Faster

Press Association, Inc.

Driver doesn't even leave seat as freshly painted tank bakes dry in 4 minutes (instead of 24 hours) by passing through this tunnel of Infra-Red Lamps at U. S. Army Ordnance Depot, Chester, Pa.

Infra-Red is hastening victory by saving up to 95% *in finishing time* on vital war materiel. Thanks to Infra-Red, tanks, jeeps, cannon and other fighting machines are now getting into action infinitely faster and are protected by *more lasting and uniform finishes* than were ever possible by old air-drying methods.

Exhaustive tests by industrial leaders have led to the adoption of Birdseye Infra-Red Heat Lamps by such outstanding wartime producers as Allis-Chalmers, Bulldog Electric, Curtiss-Wright, Dow Chemical, Square-D and many others.

The Birdseye line now offers a wide selection of rugged tungsten-filament Infra-Red Heat Lamps ideally suited to various finishing purposes. There are thirteen types and sizes, all with a 6000-hour average life. Write today for Booklet N-5.

BIRDSEYE INFRA-RED HEAT LAMPS

WABASH APPLIANCE CORPORATION

345 CARROLL STREET, BROOKLYN, N. Y.

Manufacturers of Wabash Photolamps and Superlite Light Conditioning Bulbs

This method of repairing builds up a permanent tough hard film which adheres well, dries quickly and perfectly matches the surrounding surface in color and sheen.

Information about this remarkable method of finish repairing, and all materials for the work can be obtained from Finishine Laboratories, Inc., 627 Tallman St., Syracuse, N .Y.

Plastic Body for Spray Gun

The Eclipse Air Brush Co., Newark, N. J., manufacturer of spray guns, has turned to plastics for its latest models. After much experimenting with materials that might be used to replace aluminum for the handles, a Bakelite phenolic molding material was selected. The new models are light in weight, resistant to chemicals, resistant to shock, and have a good appearance. In use eight months, they have proved that they can take the beatings these guns often get.

Molded by the Mack Molding Co.

Mearl Corp. Purchases New Factory at Eastport, Me.

H. E. Mattin of The Mearl Corp., 153 Waverly Place, New York, N. Y., announces that the company has purchased a new factory at Eastport, Me., and is concentrating all of its pearl essence production there. The company is using its factory at Roselle Park, N. J., only for war effort development. The new factory will house both the laboratory and cleansing operation of the pearl essence process.

Metal Coating Compound for Use Before Drawing

The Magnus Chemical Co., Garwood, N. J., has developed a new metal coating compound for coating metal preparatory to drawing.

This material is applied as a dip coating to high or low carbon steel wire, copper-coated wire and stainless steel wire after pickling. It was developed to replace the usual lime coat. Magnus Metal Coating Compound is also used for coating steel cartridge cases or similar drawn shapes before drawing.

This new coating process is cleaner and more economical than previous procedures. It's use results in easier, more satisfactory drawing with better metal surface and longer die life.

Aluminum Industries Names Paint Sales Manager

Aluminum Industries, Inc., Cincinnati, Ohio, manufacturer of Permite Products, announces the appointment of Michael Malachi Carmody as Sales Manager of its Paint Division. In this capacity, Mr. Carmody will have charge of the sales of Permite ready-mixed aluminum paints and Permite industrial finishes.

M. M. Carmody, Sales Manager for Paint Division of Aluminum Industries, Inc., at Cincinnati, Ohio.

Since 1923 Mr. Carmody has been associated with the manufacturing and selling of industrial paints and varnishes, and during the past three years has specialized on servicing industries producing all types of equipment under the Armament Program. From December 6, 1917, to August 18, 1919, Mr. Carmody served in the U. S. Navy.

Doing War Work?

CHECK WITH HILO ON FINISHING PROBLEMS

If your war work requires government-specified finishes and protective coatings, Hilo can probably be helpful to you. Check your current requirements on this convenient chart:

PROTECTIVE COATINGS THAT MEET U. S. GOVERNMENT SPECIFICATIONS

- ☐ Federal Spec.
- ☐ Panama Canal

U. S. Army

- ☐ Air Corps
- ☐ Chemical Warfare
- ☐ Corps of Engineers
  - Construction Div.
  - Military Div.
- Ordnance Dept.
  - Arsenals
  - Motor Trans. Div.

Quartermaster Corps

- Army-Navy Aeronautical
- ☐ U. S. Coast Guard
- ☐ U. S. Maritime Comm.

U. S. Navy

- ☐ Marine Corps
- ☐ Bureau of Ordnance
- ☐ Bureau of Supplies and Accounts
- ☐ Bureau of Ships

Dept. of Yards & Docks

- ☐ U. S. Post Office
- ☐ U. S. Treasury
- ☐ A. S. T. M. Spec.

HILO

There are hundreds of Hilo coatings available, in addition to those listed above; tell us your needs . . we'll rush samples, data sheets and handling information.

Established 1863

HILO VARNISH CORP.

42-60 Stewart Avenue BROOKLYN, N. Y.

BOSTON: *Park Square Bldg.* **CHICAGO:** *2420 Washburne Ave.*

Questions and Answers

Waterproof Coating for Laundry Washer

We would appreciate it if you would give us the name of the manufacturer of a varnish or other coating which could be used on the outside of wooden cylinder-type laundry washers, and which would withstand the heat and strong soap suds that run down the front of the machines. Ordinary varnish will not withstand this service.—D. C. Co.

We have sent this inquirer the names and addresses of a few manufacturers of thin penetrating, water-resistant sealers for wood. It occurs to us that two or more applications of such a sealer, plus a top coat of waterproof finish (perhaps aircraft plywood finish), would answer the purpose. Additional suggestions or recommendations from readers will be welcome.—ED.

Plumbing Fixture Coating

On pages 8 and 97, in the March issue, W. D. T. inquires for some manner of "chemically plating" plumbing fixtures because the use of nickel and chromium is curtailed.

Several years ago, before the advent of chromium plating on automobile accessories and trimmings, some of the larger automobile supply companies offered a chemical solution for superficially plating those parts where the nickeling had been polished off and had left the brass or copper base exposed. The same product was offered for home use, to rejuvenate tarnished brass faucets, etc., in the kitchen, bath and elsewhere. It silver-plated and polished at the same time.

Undoubtedly silver plating itself would not be the solution to W. D. T.'s problem, but it is an idea that might engender thinking along similar lines and eventually lead to something practicable. Because the procedure is so very simple, it is worth trying merely as an expedient, therefore the following data is outlined for the above material: It works immediately and satisfactorily on brass and copper; should it not operate on his die-cast metal, possibly the latter could first be brass or copper plated.

First, dissolve 1-oz. of silver nitrate into 16 fluid ounces of *distilled* water. Next, dissolve 2-oz of potassium cyanide into 48 fluid ounces of *distilled* water. Now combine both solutions, then add 1-lb. of screened precipitated chalk. Agitate vigorously, then pour it into amber glass bottles. Before using, shake the bottle until all the chalk is in suspension. Apply the liquid to a soft cloth and rub briskly, as with any metal polish; this will deposit a coating of pure silver. Burnish bright with a dry soft cloth or by brief contact with a soft buffing wheel. Finally, wash off clean with soapy water.

CAUTION—The product is poisonous, therefore necessary precautions must be exercised against the material getting into the blood or the stomach of whoever works with it.

Further, I would suggest that W.

JST OFF THE PRESS! SEND FOR THESE

TESTORS PRODUCTS SHEETS

OF U.S. ARMY, NAVY, AND AIR FORCE

Specification Finishes

ese Products Sheets will be helpful to you, because they contain complete boratory, production, and application details on a wide range of U. S. Army, ry, and Air Force specification finishes which we are prepared to furnish you mptly and in any volume. Send for the entire file today. (Write on your siness letterhead, please.) At the same time, request the illustrated folder ich describes our modern production facilities. In addition to supplying ndard specification materials, we will be happy to place our research labtory at your service in the development of new and improved formulations meet special finishing problems. You will find us . . . at all times and in all ys . . . a dependable source of supply!

STOR CHEMICAL COMPANY ROCKFORD ILLINOIS U.S.A.

D. T. investigate the feasibility of nonelectrolytic plating with various other metals. Tin plating, for instance, is one metal that lends itself to the immersion process, without electric current from an outside source. Tin plating may be done on brass, and also on iron. There are several modified procedures, but to relate the following electrochemical immersion will suffice:

A typical solution contains stannous chloride crystals, 4-oz. per gallon, and sodium hydroxide, 8-oz. per gallon. The brass objects are placed in an iron vessel, on iron wire trays covered with perforated sheets of tin. The vessel and its contents are then heated to 194° F. for 2 to 3 hours. Tin becomes the anode, passes into solution, and is deposited on the brass. After coating, the work should be rapidly rinsed and dried. All articles for simple immersion must first be thoroughly and systematically cleaned. After treatment in the tinning bath, they are generally dried and polished by shaking in sawdust, leather scrap, whiting or other polishing materials, in tumbling barrels.—MATE.

Bottle-Cap Finish

In March issue, on page 8, the S. B. Brewing Co. inquired for a method of removing the tin coating from bottle caps, so that the latter could be chemically refinished in black.

An understanding of the problem is first in order: Bottle caps are punched from "standard coke" tinplate, which is the cheapest grade made because it carries the lightest coating of metallic tin. Tin has a very low melting point—only 450° F. Tin is soluble in some acids and in hot caustic solutions; principally hydrochloric acid, and aqua regia (nitro-hydrochloric acid—generally a mixture of 18 parts nitric acid and 82 parts hydrochloric acid).

With the foregoing explanation, it is obvious that several methods could be resorted to for removing the very light coating of tin on bottle caps. However, in line with commercial practice, the following further information should be helpful:

Tin scrap from the trimmings and punchings in the making of tin cans and pails, is utilized by metal reclaiming plants for de-tinning, primarily to obtain the tin oxide (stannic anhydride) which is the valuable white pigment required in ceramics, for enameling bath tubs and stoves, and all similar fused-enamel finishing; secondarily to market the basic scrap iron. That process, in one large plant, was this:

About 300-lbs. of tin scrap was packed into a large wire basket and submersed in a water solution of caustic soda and a nitric salt (which likely was nitrate of soda) in a cylindrical iron tank about 4-ft. high and 4½-ft. in diameter. This vat had a double bottom between which was a steam coil to boil the solution. De-tinning was accomplished in 30 to 45 minutes, and several batches (40 to 50) were worked in the same solution until its strength was exhausted and the operation became too slow.

Each basketful of de-tinned scrap was drawn up by hand crane, dipped into a tub of water to rinse, and thrown into a press to bale as scrap iron, and was sold. Beyond this point was the reclaiming of the tin oxide from the solution. With bottle caps, however, these would have to be rinsed in a hot neutralizing solution (baking soda should be suitable) and through clean wash water; then immediately dried by oven heat to prevent rusting.

Another method is by shooting chlorine gas into a revolving cyl-

RELATED SYMBOLS

V for Victory . . . but V can also be the symbol for blood, sweat and tears, and a host of other meanings, including precision and accuracy—which is what the micrometer stands for in the G I F trademark. When you see that symbol on a container you may be sure that the contents conform to specification requirements and have been checked and rechecked for uniformity. Mark the items in the box that interest you and write for further particulars.

- Metal primers for tanks, blitz cans, bombs, gun mounts, etc
- Lusterless Enamel Finish Coats for use over metal primer.
- Camouflage paints or compounds for metals and textiles.
- Coatings for roll coat application on land mines, gas mask canisters, hand grenades, etc.
- Interior coatings and sanitary lacquers for food and beverage containers.

GENERAL INDUSTRIAL FINISHES
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PROTECTIVE COATINGS
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inder containing the tin scrap to be de-tinned. Much heat is immediately evolved in the reaction of the chlorine gas with the metallic tin. When the temperature subsides, it indicates that all of the metallic tin has been converted to sodium stannate, which also is a white powder or pigment used in ceramics.—EXAMINER.

Removable Coating for Electrical Rings

I have a problem in my department that I would like to straighten out.

We have rings which we have to heat to 150° F. and then dip them in a varnish dip to insulate the field coils that are inside these rings.

They are field rings for a generating unit. Then they are put back in the oven again and heated to the same temperature, and then dipped again and put in the oven for a final baking for 10 or 12 hours. Next they are taken out and the varnish that sticks to the edge of the ring, which has to make the ground on the crankcase, has to be scratched off. The problem is this:

I am trying to eliminate the long and costly job of scratch-brushing this varnish off the ring by putting on several materials—tape, grease, hand cream, etc. The only thing that comes close, so far, is plaster of paris.

I am wondering if you can suggest anything better, as even this doesn't work too good, as the varnish soaks through and still hangs on. We want something that can be chipped off and if necessary use a little on the scratch brush.—P. W.

It so happens that we have recently developed a material for just such applications as you have described. Accordingly, we are sending you, for your examination, a small sample of Sterling S-159 Stripper.

We would suggest that this material be applied by brush to the field rings of your generating unit prior to the dip in insulating varnish. Apply with a full brush so that a good coating can be obtained without brushing out. The stripper will dry in two or three minutes and will not be affected in any way by the varnish. After your varnish treatments have been completed and thoroughly baked, the varnish and stripper can be easily removed with a wood or bakelite knife. The blue color of the stripper makes it easy for the operator to see when all material has been removed.

We shall greatly appreciate it if, when your tests are concluded, you will advise us whether or not the material works entirely to your satisfaction.—THE STERLING VARNISH CO.

Hammering Finished Surfaces

THERE are times when it is necessary to use a hammer or mallet on finished surfaces. One way to do it without marring the finish is to use a block of soft wood, placing the wood against the surface and striking it moderately with a hammer or mallet. In the case of surfaces that are highly susceptible to marring, the wood block can be padded on the face with fabric or chamois, so the force of the blow will be transmitted through something soft. However, for general use on finished surfaces, a mallet that is itself a safeguard against marring will be found highly convenient. Possibly one of the best tools for this purpose is the rawhide mallet. Mallets with rawhide faces are available.

STERLING 1000

New Electric Portable Sander

SWIFT AND SMOOTH!

Get the job done quicker—*and better* with the new "Sterling 1000!" Powerful ... rapid cutting—yet, because of skillfully engineered counter-balanced mechanism it operates *without a trace of vibration!* So smoothly does the "Sterling 1000" handle—that women operators prefer to work with this new sander. Elimination of operator's jingle-jangle nerves alone means higher quality work! And this sander is *tough*—sturdily built to serve you dependably ... even under heavy production pressure.

Designed on New Sanding Action Principle!

Orbital, circular, thousands of abrasive grains cut furrows which cross and re-cross each other. With this action, the "Sterling 1000" cuts faster—produces the smoothest surface you've ever known on wood, metal, plastic or composition. Ideal for many rubbing and polishing operations.

Write today for your copy of the New "Sterling 1000" folder, which describes its *21 important features* in every detail.

STERLING TOOL PRODUCTS COMPANY

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5 W. WASHINGTON BLVD., LOS ANGELES, CALIF. 74 WELLINGTON STREET, W., TORONTO, CANADA

Letters from I. F. Readers

(Continued from page 8)

so schedule their "Protective Coatings" orders.

I feel that your excellent magazine could take the lead in this matter, in an impartial way, and as a consequence render valuable assistance to users as well as makers of these coatings. The War Production Board will, I am sure, be pleased with the effort. Keep up the good work; let's get the war behind us.—X.

Waterproof Varnish; Benzoin

In November 1942 issue of your fine magazine I read an article on French Polishing, by our good friend Mr. Hogstrom. I think it is excellent. Comments by Wm. F. Behlen, Lyndhurst, N. J., who mentions waterproof French varnish manufactured in New York, N. Y., also interests me. Will you kindly furnish their addresses? In this same article Mr. Hogstrom mentions "Benzoin." Where can I obtain this?" —Californian.

In a letter we are giving you the names and addresses of the manufacturers of finishing materials referred to by Wm. F. Behlen.

The "Benzoin" mentioned on pages 55 and 56 is a gum, something like shellac or varnish gum, and we presume it can be purchased (if available) from concerns that deal in shellac gums and varnish gums. We presume there are such concerns in one or more of the three or four largest California cities.—ED.

I Hit the Jack Pot

I suppose you wondered what happened to me, that you did not hear from me.

Well, I connected with ..... Am attached to the methods engineer force. My job will be to take care of all finishing procedure for the entire organization. I give a great deal of the credit for making this connection to the articles I wrote for INDUSTRIAL FINISHING.

It surprises a person when he first joins this company, to see how large this organization is and what a great diversity of products we manufacture. I worked for large auto concerns like Fisher Body and Briggs, but their problems are few compared to what we have. In ..... [one plant] alone we have about 100 spray stations, and we use over $1,000,000 worth of paints a year.

I always did want a job where I could cope with one problem after another. Well, I certainly got my wish! Incidentally, don't be surprised if I submit quite a few problems to you. Mostly searching for certain materials to perform very special tasks. I will gladly welcome any literature on any special products. . . .—Mr. X.

Fume-Proof Paints

In your February issue, page 103, is a paragraph on fume-proof paints, signed "Keeler & Long, Inc." We want a paint to resist fumes from sodium sulphide. Would you write us where to contact Keeler & Long, or possibly send them this letter?—H. J. & Co. (Clear Soluble Nitrate Film).

I would appreciate it if you would send me a copy of the report of Keeler & Long, Inc., on fume-proof paints, as referred to on page 103 of Feb. issue. —C. S. G., Materials Laboratory Branch, The Engineer Board, Fort Belvoir, Va.

We are referring this to Keeler & Long, Inc., Waterbury, Conn.—ED.

No Dipping Machines

Your letter of February 24th at hand referring to dipping machinery, but due to the enormous amount of high-priority orders on hand, we have been obliged to discontinue the manufacture of the dipping machine for the duration.—Bignell Machine Co. (Successor to C. W. Smith, M. E.).

Two Central Region Offices Opened by Detroit Rex

W. W. Davidson, vice-president and general sales manager of Detroit Rex Products Co., manufacturers of Detrex solvent degreasers and metal washing equipment, announces the establishment of two new offices. The North Central Region, which includes the entire state of Michigan except the upper peninsula, has headquarters in Detroit. R. W. Pflug, who is in charge, also supervises the handling of large national accounts whose home offices, including purchasing and control, are in Detroit.

W. F. Newbery is manager of the South Central Region which comprises the states of Ohio, Indiana and Kentucky. Offices for this territory were recently established in the Mutual Home Building, Dayton, Ohio.

Remember Pearl Essence for

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"WORLD'S LARGEST PRODUCER OF PEARL ESSENCE"

Booklets Catalogs Circulars

Spraying of High Temperature Materials

An illustrated bulletin that gives information on material heating, material pumping and spraying equipment for the application of lacquers, varnishes, paints or oils at elevated temperatures (110° to 190° F.) has been compiled by engineers of The DeVilbiss Co., Toledo, Ohio. Both steam-heated and hot-water heated units are featured.

War-Formulated Paints by S. C. Johnson & Son

S. C. Johnson & Son, Inc., Racine, Wisc., reports a casualty—and introduces an unusual replacement. The casualty is Johnson's Wax-Fortified Paint. It is off the market for the duration of the war. Certain ingredients used in the manufacture of this line of paints are no longer available to any manufacturer. The company anticipated this condition and its laboratories worked out a replacement for the Wax-Fortified line, and now has it ready. A booklet describing Johnson's War-Formulated Paints will be sent free to readers who ask for it.

Working and Cleaning Stainless Steel

Because the rapidly increased use of stainless steels in aircraft factories and other metal-working plants has brought about various new fabricating problems, Oakite's Technical Research Laboratory has prepared a Special Service Report describing how the use of various specialized Oakite machining, drawing, degreasing and descaling materials speed up and simplify the fabrication and surface treatment of stainless steels. A free copy of this Service Report will be sent to any readers who make inquiry for it. Write Oakite Products, Inc., 22 Thames St., New York, N. Y.

Color Facts in Free Folder

"Coloright Inks" is the title of the 11th folder in the Color Facts Series issued by Eagle Printing Ink Co., Division of General Printing Ink Corp., 100 Sixth Ave., New York, N. Y.

This folder contains a practical check-list and swatches of 18 hues perfectly adapted to all forms of printing and advertising. These colors may be specified with assurance for they represent the most popular colors as determined by consumer tests and sales records.

In addition, a portion of this folder is devoted to Colorcues, and the review of a number of facts and principles which will be helpful to users of color.

How to Make Your Safety Equipment Last Longer

Just published by Mine Safety Appliances Co., Pittsburgh, Penna., is a comprehensive 32-page handbook entitled "How to Make Your Safety Equipment Last Longer." It is ready for wide distribution to industry without charge.

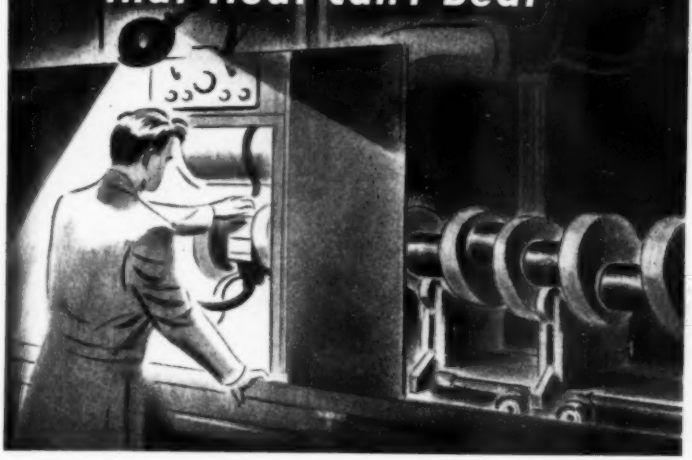
Covering every type of personal protective equipment (protective hats, gas masks, respirators and gas instruments, through the list to safety clothing) this well-illustrated book details the practical "do's and dont's" of safety equipment care for key personnel, in a form readily adaptable for instruction of equipment users.

How to Use Fire Extinguishers

American-LaFrance-Foamite Corp., Elmira, N. Y., announces two new fire extinguisher charts, showing the operating characteristics of first aid hand fire extinguishers and wheeled engines.

The charts clearly and concisely tabulate the several types of hand fire extinguishers and wheeled engines, and their suitability or otherwise as applying to Class "A," "B" and "C" fires, in accordance with Underwriter's Laboratories classification. For convenience, a Class "D" is added to cover the fire hazards of automobiles, commercial trucks, etc., and Class "DT" to cover the fire risks pertaining to tank-trucks and trailer-tractors.

THE MARKING PAINT
that Heat can't Beat



EACH batch of the forgings that are machined into Diesel crankshafts must be identifiable throughout the manufacturing process. And that's a job for paint on the webbing between bearing surfaces. But ordinary paints charred beyond recognition in the heat treat ovens—and gave off smoke and noxious fumes. So Arco formulated a paint which minimizes smoke and fumes, and which retains enough color for identification despite the heat. And a special solvent removes it at the end of the process without endangering the mirror finish of the adjacent bearing surfaces.

Thus the Arco Research Laboratories meet specific needs with specialized products, tailored to fit. Those Laboratories are at your disposal to help you find the solution to any problem paint can solve. Your inquiry will receive prompt attention.

War Paints for Industry **THE ARCO COMPANY**
CLEVELAND, OHIO · LOS ANGELES, CALIFORNIA

Recommendations are also included for alcohol and kindred fire hazards.

The charts give complete data in condensed form as to extinguisher and engine characteristics, methods of operation, capacity, range of stream, etc.

Under the present emergency conditions, it is of paramount importance that each type of extinguisher be fully understood; that one type is the right kind to use on one fire, while another extinguisher, misapplied, might prove disastrous.

The charts give this information, and will afford an invaluable fire-fighting guide. They are free upon request.

Balanced Lighting Booklet

"Save With Balanced Lighting" is the title of a new 12-page 8½x11-in. booklet announced by The Fostoria Pressed Steel Corp., Fostoria, Ohio. It tells what balanced lighting is, how to achieve it, and what benefits are received. It illustrates and describes how balanced lighting saves critical material, power, workers' eyes, time and investment. Copies of the booklet are free.

Radiant Heat Booklet

An interesting and attractive booklet of 12 pages 8½x11-in. contains information and illustrations on infra-red heat applications in industry—particularly for drying paint coatings. Write to your nearest Westinghouse branch for a free copy.

War Paint Bulletins

Ordnance colors, camouflage colors, Navy camouflage paints, and marking colors for overseas shipments are shown and briefly described in new bulletins issued by Hilo Varnish Corp., Brooklyn, N. Y. In the camouflage paints bulletin, for example, ten camouflage colors are shown. These are available in oil type, oleoresinous emulsified type, and bituminous emulsion type.

Surface Preparation Before Black Oxide Finishing

A concise compilation of technical data relating to the surface preparation of ferrous and non-ferrous metals before application of black oxide finishes is contained in a new 20-page booklet issued by Oakite Products, Inc., 57 Thames St., New York, N .Y., as an aid to plants and shops engaged in this important phase of war production. The booklet is free.

Stressing the importance of obtaining a chemically clean surface prior to this particular finishing operation, the booklet gives detailed formulas and techniques for removing either drawing and stamping compounds, fabricating oils, smut, grease, rust and scale from iron, steel, zinc, copper, brass, bronze and aluminum.

The booklet also reviews data on the reclamatoin of black finished parts that have failed to pass inspection due to faulty fabrication or incorrect surface preparation or finishing, as well as on the construction and operation of such surface-preparation equipment as still cleaning, electro-cleaning and acidic-solution tanks.

Blackening Processes for Metals

An 8-page bulletin, printed in black and red illustrates and describes the "Ebonol" processes for blackening iron, steel, zinc, zinc alloys, copper, copper alloys, aluminum and aluminum alloys. The blackening is produced by immersion in a hot chemical solution. Equipment, methods and results are revealed. Write The Enthone Co., New Haven, Conn., for a free copy.

Stops Condensation Drip

Getting right down to the bottom of the condensation drip problem, the 32-page NoDrip Handbook tells how to prevent and cure damaging condensation and sweat that forms on precious metal pipes and fixtures, on basement walls, ceilings of concrete, wood plaster, etc.

Up-to-the-minute quick tempoed, it presents the solution, with illustrations, of recurrent and destructive conditions of dampness and corrosion.

Instructions as to application, coverage, drying time; complete listings of the many uses for NoDrip; and other valuable data—all contents are listed on the front cover. This book is probably the most complete study available today on condensation and its cure.

Copy of the handbook will be sent on request to the J. W. Mortell Co., Kankakee, Ill.

Paint Spray Booths

A 4-page bulletin, printed in black and blue, and illustrating views of water-wash spray booths for industrial painting operations, has been released by the Aqua-Restor Division of Mayer Mfg. Corp., 51 Division Place, Brooklyn, N. Y.

H. BEHLEN & BRO., Inc.

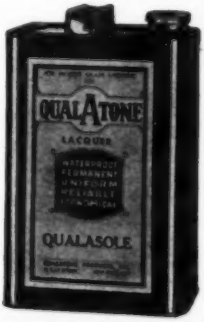
10 CHRISTOPHER STREET **NEW YORK CITY**

ANILINES—WATER AND OIL SOL. STAINS

Hardwood Finishing Headquarters Since 1888

QUALATONE PRODUCTS, INC.

21 GAY STREET **NEW YORK, N. Y.**



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H. BEHLEN & BRO., INC.

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Industrial FINISHING

Distributed monthly to finishing room and paint shop foremen, production superintendents and company officials of metalworking, woodworking and miscellaneous industrial plants where production finishing is a major operation in parts and products manufacture.

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Editorial

Materials on Allocation Must Have End Use Certified

What you can do to help your supplier of finishing materials, so he can furnish what you want (if available) when you want it (if possible) is explained in a letter sent out recently by a representative manufacturer of protective, identification, camouflage and decorative coatings for both war and civilian use. The letter is as follows:

"Most of our products are made with materials that are on allocation, and these are obtainable only through WPB release. In order that we may give prompt service, it is desirable that you give us the information which will help us secure these materials to fill your orders.

"The following excerpt from a letter by Mr. Lawrence Brown, Assistant Director, Chemicals Division, War Production Board, emphasizes that allocations are based principally on end use and that it is important that such end use information be included.

" 'You likewise raise the problem of how a manufacturer of paint is to obtain end use information from a customer. In some of our orders there are specific provisions that the applicant on the PD-600 is required to obtain from his customers a clear certification concerning end use. Other orders do not carry this specific provision, but I am informed by our lawyers that by inference an applicant has the right to obtain such information, since the order requires him to pass on to the WPB not guesswork but definite information . . . inasmuch as raw materials will not be granted except on clear end use information, I believe that pressure on the customers will shortly produce the necessary results. No manufacturer need be afraid of losing a market to a competitor by insisting on this information, because his competitor will be equally unable to obtain raw materials without the same information.'

"The copy of a letter [published in April issue of INDUSTRIAL FINISHING, pages 8, 98 and 99] by Mr. E. H. Bucy, Chief of Protective Coatings Section of the WPB, also stresses the necessity of such data.

"These show, you will agree, the

'must' of our obtaining the information needed to have raw materials allocated to us to fill your orders. This information is:

"Priority Rating; End Use Symbols (Army, Navy, Lend-Lease, etc.) and the article to be finished and where it will be used.

"Purchaser (Issuing Government Office) and Contract Number and Specification Number, if any.

"Your cooperation in supplying us with this necessary information will greatly assist us in obtaining materials promptly to fill your orders."

In addition to what is emphasized in the foregoing letter, manufacturers of finishing materials are urging customers to anticipate their needs far ahead of time and order materials 30 days, preferably 60 days, in advance of the time they expect them to be delivered.

In many cases these requests or requirements will be difficult or inconvenient to meet. True; but it's up to the individual or concern who wants something, to find ways to meet the requirements for getting it. Doing business in wartime isn't as easy or smooth as in peace time. Our armed forces are in the fiercest kind of combat with powerful, prepared, fanatical militaristic foes in and across the Atlantic, and in and across the Pacific—we have two big wars at one time — therefore for many of us there is no more "business as usual."

Too Many Accidents

In 1942, our first year of the war, 93,000 persons were killed and 9,000,000 injured by accidents in the United States. The total estimated cost of these accidents was close to four billion dollars. It is hardly necessary to point out the tragic consequences of this staggering toll. But it should be kept in mind that accidents in these times also constitute a very real menace to our all-out victory effort by keeping much-needed workers off the job, and by preventing the civilian population from doing its total best.

The United States depends upon scrap as the source for approximately 40% of its copper. Hamilton Wright, Chief of the WPB Industrial Salvage Branch, has informed all offices to put particular emphasis on dormant copper, brass and bronze scrap.

Challenge of Air Age

★ One of the most provocative statements in years is contained in an advertisement by Consolidated Aircraft, which is currently appearing in many leading magazines and newspapers. Probably you have seen this ad, showing a global air-distance map, together with this penetrating sentence: "Today, wherever you may live, no spot on the once wide globe is farther than 60 hours from your local airport."

Those words should be thoroughly digested by every alert American, particularly by our manufacturers. The impact of the facts behind that declaration may be as significant as the industrial revolution of the 19th century.

The universe has become one big neighborhood—and one huge market. America must accept its new responsibility as the leader of the new air age. We must resolve to

★ Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

work closely in the future with men of good will throughout the world.

But, along with our new responsibilities, there will be unparalleled opportunities. Tremendous new areas will be opened up—in South America, in Africa, in Asia—for American ideas, as well as for American typewriters, washing machines, and radios. Will our manufacturers be ready to meet this challenge?—H. S. LAWRENCE.

Morale in War Plants Helps Production

★ Keeping the high standard of morale among the workers in war plants is as important as it is in the armed forces. Without a high standard of morale in the war plants, production is likely to lag; quality of products may be low; and the "don't care" attitude prevails in some cases.

We may not all agree on the definition of morale, but I think we can all agree that where a high standard of morale prevails, we all have a feeling of self respect; we have the attitude and spirit of turning out quality products in large quantities in order to help the United war effort.

High standards of morale can be helped in the plants in many ways, and can be kept up so long as these things are done:

First, I think all supervisors should be cheerful and pleasant at all times. They should speak in a clear articulate voice when giving orders to workers; they should be neat and clean in their dress (not overdressed, of course) and should know their jobs so that a prompt and intelligent answer can be given to questions asked by workers.

A smile is a great help to a worker who has a tough problem. Pleasant instructors will soon put the new worker at ease and thereby raise his morale, so he will strive to work for a better product. Keep the tools in their proper places; don't allow them to be scattered around. Keep all rest rooms and wash rooms clean and comfortable. Provide plenty of ventilation and as much light as possible.

Encourage the workers to keep themselves neat and clean. Experience has taught that a worker who is careless about his personal appearance may be careless about his work. If the foreman, assistant foreman and inspectors keep themselves clean and neatly dressed, they set a good example; it will spread through the entire department, to a considerable degree.

If these things are done in our war plants, it will help us to a speedy victory and make this country a better place in which to live after the war is over.—F. HAGAN.

Random Comments on the Industrial Scene

Author's introduction — In the course of my business activities, I have occasion to study many trade and economic reports, bulletins and commentaries. I also conduct a rather extensive personal correspondence with friends in various branches of industry.

It therefore occurred to me that I might be in a position to contribute, from time to time, a brief distillation of industrial comment—in a somewhat informal vein. . . .— L. H. S.

* * *

A number of astute Washington observers have recently predicted that re-conversion of some war plants to civilian production may begin within a few months. Several indications of this possibility have been noted: First, new plant pro-

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Established 1917

ARE YOU ACQUAINTED with SILK SCREEN PRINTING

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We manufacture complete printing equipment to meet particular requirements and if desired, do silkscreen printing on contract in our plant.

When writing for information state your specific problem.

COLONIAL PROCESS SUPPLY CORP.
140 West 23d Street **New York, N. Y.**

Skip Bombing in Bismarck Sea

AIRPLANES
GUN STOCKS
BOMB SIGHT BOXES
TOOL CHESTS
MARINE PARTITIONS
RADIO INDUSTRY, ETC.
SKIS
INSTRUMENT BOXES

LT. GEN. GEORGE C. KENNEY, *Commander*, Allied Air Forces in the Southwest Pacific, sent his intrepid flyers into the battle of the Bismarck Sea with new methods and a new technique that brought astounding results.

Skip bombing was introduced in this engagement and contributed considerably to its success. Bomber planes approach at mast height and the forward motion causes the bombs to hit the ships at the water line as though they were torpedoes.

New methods and new techniques on the production front have also achieved amazing results in producing and delivering goods to our fighting men. *Listed here are a few of the war products now being coated with our materials. Phone, wire or write and let one of our finishing experts help you "keep production rolling."*

THERE'S NO TIME TO LOSE—THERE'S JUST TIME TO WIN!

THE LAWRENCE-McFADDEN CO.
Headquarters for Fine Finishes Since 1875
7430 STATE ROAD PHILADELPHIA, PA.

duction has practically ceased; and second, there has been a sharp curtailment of new orders for machine tools.

This is by no means taken to indicate that our production chiefs believe the war is already won. But it is apparent that huge stockpiles of many categories of war goods have been built up, taxing storage facilities severely at many points.

* * *

The United States built more planes in 1942 than in the previous 23 years combined! And that was only a warm-up for '43.

* * *

I have a private hunch that color engineers are going to be as important to industrial manufacturers after the war as plant engineers. I have a feeling, for example, that refrigerators will discard their hospital white, and one day will feature pastel tints to harmonize with kitchen decorative schemes. (I expect this statement will entice some alarming head-shaking. I suggest that you paste the item in your advance file, dated ahead for some time in 1946, and then see whether I'm right!)

* * *

And, speaking of refrigerators, I hear that post-war models are going to feature such novelties as automatic ice-cube lifters and meat-tenderizing compartments. What, no electric cocktail mixers?

* * *

Scouts tell me that Consolidated Vultee Aircraft is toying with the idea of producing prefabricated houses after the war. Perhaps these units will be so equipped that the homes might be easily shifted to Florida in the winter, and to the northern lake country in July!

Which reminds me of the fact that one enterprising manufacturer of prefabricated housing—The Homasote Co., Trenton, N. J., has been displaying scale models of the homes they expect to sell after the war, at a number of our large department stores. Recently I visited their exhibit at R. H. Macy's, in New York. They are even encouraging prospective buyers to start saving for their houses-of-the-future now. Incidentally, this manufacturer claims that only six to 30 days will be required, after an order is placed, for all construction to be completed on the site.

* * *

Memo for Pessimists: An official of Amtorg, the Russian trading company, was recently asked about the prospects for communism in America. He replied: "How can you have communism in a country where every capitalist is once removed from the proletariat, and where every proletarian has ambitions to become a capitalist?"

Foreman Finisher Prefers Pressure Tanks

I HAVE noticed an element of hesitancy on the part of some manufacturers as to the merits and efficient use of pressure tanks. These manufacturers seem to think that pressure tanks either waste paint, or that their sprayers do not get enough mileage. This is not true of either the tank or the operator, as the tanks really save both time and material and surely make it very much easier for the operators.

Finishes sprayed from pressure tanks are much more uniform, especially so on wrinkle finishes. I have found that by using pressure tanks I save from one-fourth to one-third of the amount of paint I previously used by spraying from a

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For The
PAINT, VARNISH, AND LACQUER INDUSTRIES
Send for our new catalogue, "Chemicals by Glyco."
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"25"

This NEW Crown gun gives high efficiency and speed in production work and maintenance and other painting and finishing jobs . . Uses time-tested Crown "20" Spray Head assemblies . . Full Spray Width, Material Adjustment . . Write for literature and prices.
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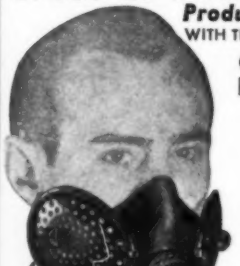
★ Full U. S. Bureau of Mines Approved (No. BM-2142) against Type A (Silica), Lead and Nuisance Dusts. Equip your workers with this new COMFORTABLE and SAFE Respirator for FASTER DEFENSE PRODUCTION. It's the "Cesco No. 94." Write.
Chicago Eye Shield Co.
2367 Warren Blvd. Chicago, Ill.

gravity container. I also found that my production went up 20%, and in some cases 30%.

The cost of these tanks is not too much, when you take into consideration the time and material saved. We use them for all finishing, and our finishing department shows us a very good profit.

I mentioned that tanks do not waste paint. They do not, but if the operator does not control his pressure gauge properly, they will. We find that by using approximately 10-lbs. of air for pressure, and 75-lbs. at the gun, on either wrinkle or synthetic enamels, we get quality finishing at the lowest possible cost. These pressures may seem high. Perhaps so, but for our work and our conditions, they are satisfactory. Of course, the equipment must be kept clean and in the best possible condition.—J. G. S.

Painting Woven Wire Fences

SINCE so many manufacturing establishments are now surrounded with high woven-wire fences, supported in most cases by iron or steel fence posts, these concerns will soon be confronted with a maintenance repainting job. Otherwise rust will eventually take these fences — and while this rusting process is at work the fences become weakened and present an unsightly appearance.

Neither brush painting nor spray painting is especially suitable for repainting a high woven-wire fence —one because it takes so much time and labor; the other because so much paint is wasted and blown over adjoining buildings, sidewalks, parked automobiles, etc.

An effective commercial method, which has been developed and used extensively for this work, where it

WITH MANY MATERIALS

SCARCE

you'll need new ideas to supply your customers with new and attractively finished items.

CLAREMONT FLOCKS FILL THE BILL!

Through the use of these tiny fibers of

COTTON, WOOL OR RAYON

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SAMPLES AND COLOR CARD ON REQUEST

CLAREMONT WASTE MFG. COMPANY

CLAREMONT, N. H.

The country's largest mfrs. of Cotton, Wool and Rayon Flocks

must be done on a reasonably large scale, is the flow-coating process.

As in all efficient product painting and maintenance painting, the work should begin with careful preparation of the surfaces. This will include removal of loose scale and rust, and any dirt or other foreign substance. For this surface cleaning a large hand wire brush or a portable rotary power brush may be used.

After thoroughly wire brushing all rusted surfaces, these areas should be treated with a suitable rust-killing or rust-checking compound, of which there are several on the market. The rust-killing treatment can be applied by the flow-coating process. When the rust treatment coating is dry, the fence should be painted with a rust-inhibitive metal primer, followed by a coat of paint in whatever color is desired. All coats of material can be applied by flow-coating.

Not all paints can be flowed successfully. It requires a carefully balanced combination of proper oils, thinners, pigments and driers, and the correct pigment-vehicle ratio to build a paint that is suitable for flow-coating. The paint must be so formulated that it will flow out and drain without leaving sags and curtains. For flow-coating it is necessary to control the consistency of the paint to obtain uniform results. Controlling the specific gravity with hydrometers has proved to be satisfactory. Two hydrometers are needed for controlling the various paints — that is, if some are heavier than water while others are lighter than water.

The amount of thinning will vary somewhat, due to climatic conditions, but this can be reckoned quite

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easily, with experience. Generally speaking, the paint should be thinned more (lower hydrometer reading) for use on hot or windy days. Less thinning (higher hydrometer reading) is required for cooler weather. The consistency of the paint should be checked at regular intervals, and thinner should be added to compensate for loss by evaporation.

It is convenient to have a suitable truck (one with a low wide flat bed) on which to mount the paint-supply tank, motor-driven pump and other accessories. This truck bed will also serve as a platform on which the man stands while flowing on the paint.

Catch pans are needed to catch the surplus flow-down of paint. A convenient size is 3-in. deep, 6-in. wide and 5-ft. long. These catch pans are placed under the fence. Frequently it is necessary to dig temporary trenches under the fence to make room for them. The pans are left in position until after the paint is through draining. Then, one at a time, they are lifted up and their contents are dumped into the paint supply tank.

For best results the catch pans are constructed with an offset to clear the concrete foundations under the posts. The offset part of the catch basin is fitted with a short vertical lip to prevent loss of paint. With this construction, the posts can be flow-coated the same as the fence.

Baffle plates are positioned vertically on the side of the fence opposite to the workman who does the flow-coating. These baffle plates are fitted with hooks at the top to slip over the top rail of the fence. The length of the baffle plates is such that when they are in position

they clear the catch basins by several inches. This facilitates placing the pans in position.

Splash aprons, approximately 18-in. wide by 4-ft. long, are provided for use on either side of the fence. These aprons are provided with a hinged support on the back so they can be readily placed in the catch pan and be supported at an angle. The purpose of these catch aprons is to catch splashed and dripping paint and return it to the catch pan.

The number of men in the painting crew can be varied to suit conditions. On a big job where speed is necessary, sometimes as many as six are employed, so that the work of moving the pans, baffle plates and aprons can be synchronized and kept ahead of the painter.

In addition to the motor-driven (or gasoline engine-driven) pump and paint container, there are some necessary piping with valves, and two lengths of hose, one to take paint from the supply tank and the other to be fitted with a suitable nipple for flowing on the paint.

Some of the facts for this article were obtained from bulletins published by James B. Sipe and Co., Pittsburgh, Pa.

Thresher Varnish Co. Awarded Army-Navy E

The Thresher Varnish Co., Dayton, Ohio, subsidiary of the Pittsburgh Plate Glass Co., was awarded the Army and Navy E, April 30, during a brief ceremony within the factory grounds.

The Thresher Varnish Co. is currently manufacturing camouflage enamels, and protective finishes for tanks, locomotives, aid airplane parts. It is one of 1,200 plants in the country engaged wholly or partly in supplying paint or finishing products to the nation's war machine, and the second to have received the distinction of the Army-Navy production award for excellence in performance of war work.

SAVINGS up to 25%
of your Finishing Cost!
with a G. M. No. 5
PRESSURE SPRAY GUN

Patented Nozzle Reduces 25% Mist and Saves Paint

Better atomization, greater speed, G. M. Gun lays material more uniformly on object. Excess mist eliminated; paint saved. Patented nozzle with combination of external and internal atomization gives double breakage; finer atomization. From 1/8-in. to full wet 14-in. fan spray. Very moderate price. For details write Dept. L.

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Engineers, Mfrs. of Complete Spray Equipment
216 N. Clinton St. Chicago, Ill.

OUR MEN NEED
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ALL YOU CAN SPARE

Help a man in uniform enjoy his leisure hours. Give your good books to the 1943 VICTORY BOOK CAMPAIGN. Leave them at nearest collection center or public library.

ONCE - IN - A - LIFETIME OPPORTUNITY

for the Right Man!

Reliable, progressive manufacturer of all types of Industrial Finishing materials, offers a permanent, well-paying position of

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to an ambitious, industrious man of good character and personality who has, or can develop, good contacts with Furniture and other Industrial plants in

LOUISVILLE, SOUTHERN INDIANA AND NORTHERN TENNESSEE

The man wanted may be selling finishing materials, lumber, supplies, etc., or he may be a large user of them. He could be a technical college graduate, but common-sense and willingness to work are more important. He probably has seldom, if ever, answered an ad like this, but he recognizes an opportunity when he sees it and acts before it is too late.

This territory is established and is now paying a five figure income to a man who is being advanced to an executive position. It is serviced by nearby plants and laboratories that know how to solve problems quickly and effectively. A high proportion of present business is in War orders but satisfactory finishes of all kinds are still being supplied to customers producing civilian items. Plans are now being made for unusual post-war developments.

Please give all details of educational background, experience, present job, draft status, etc., and photograph in first letter, so personal interview may be arranged promptly. Our men know of this ad and replies will be kept in strict confidence.

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We also have openings for a number of graduate chemists, on war problems.

Classified Advertising

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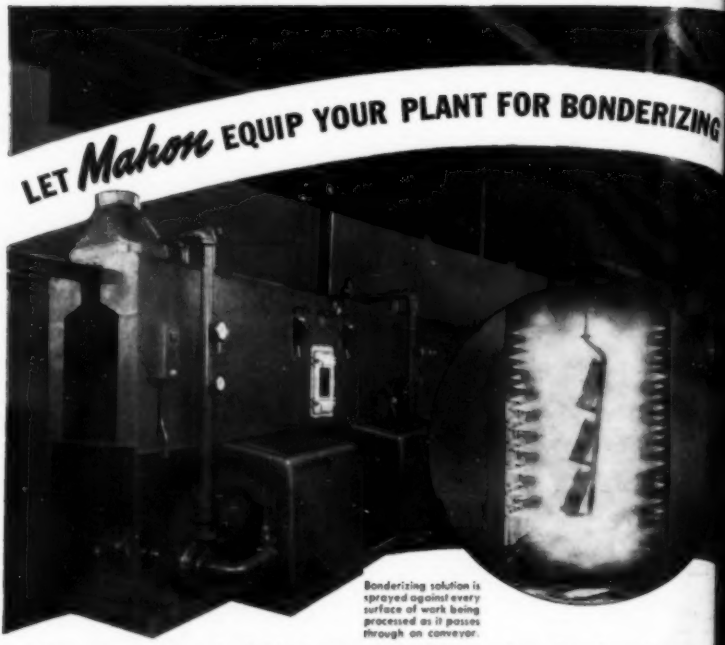

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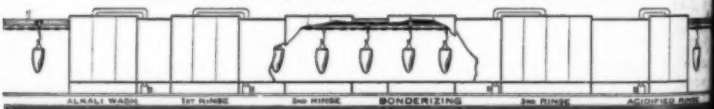

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